Programs & Abstracts

39th National Conference on Theoretical Physics

&

2nd International Workshop on Theoretical and Computational Physics

Modern methods and latest results in particle physics, nuclear physics and astrophysics

Dakruco Hotels
Buon Ma Thuot, 28-31 July 2014

Programs and Abstracts

Contents

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Welcome Message

It is a great pleasure to welcome you in the *39th National Conference on Theoretical Physics* (NCTP-39) and the *2nd International Workshop on Theoretical and Computational Physics: Modern methods and latest results in particle physics, nuclear physics and astrophysics* (IWTCP-2).

The NCTP is an activity of the Vietnam Theoretical Physics Society (VTPS) organized annually since 1976, and has become the most well-known annual scientific forum dedicated to the dissemination of the latest development in the field of theoretical physics within the country.

The IWTCP is a new activity of VTPS (second in a row) organized in association with the NCTP, and is also an *external activity of the Asia Pacific Center for Theoretical Physics* (APCTP). The overriding goal of the IWTCP is to provide an international forum for scientists and engineers from academia to share ideas, problems and solutions relating to the recent advances in theoretical physics as well as in computational physics. The main IWTCP motivation is to foster scientific exchanges between the Vietnamese theoretical and computational physics community and world-wide scientists as well as to promote high-standard level of research and education activities for young physicists.

We hope the conference and the workshop will provide each of you not only a great platform for networking opportunities and interactions with other participants, but also a memorable experience of your stay in Buon Ma Thuot. We thank you for your participation and hope to see you again next year, in 2015.

Nguyen Ai Viet
Chair of NCTP-39 & IWTCP-2

Nguyen Ai Viet is with Institute of Physics, Vietnam Academy of Science and Technology (IOP-VAST), and he is currently President of the Vietnamese Theoretical Physics Society.

Organizers

Conference

Organizing Institutions

- Institute of Physics, Vietnam Academy of Science and Technology (IOP-VAST)
- College of Science, Vietnam National University, Hanoi (HUS-VNU)

Honorary Chair

- Nguyen Van Hieu (Vietnam Academy of Science and Technology, Hanoi)

Chair

- Nguyen Ai Viet (Institute of Physics, VAST, Hanoi)

Organizing Committee

- Nguyen Tri Lan (Institute of Physics, VAST, Hanoi), Chair
- Trinh Xuan Hoang (Institute of Physics, VAST, Hanoi), Co-chair
- Bach Thanh Cong (College of Science, VNU, Hanoi)
- Hoang Dzung (Vietnam National University, Ho Chi Minh city)
- Hoang Anh Tuan (Institute of Physics, VAST)

Program Committee

- Nguyen Toan Thang (Institute of Physics, VAST, Hanoi), Chair
- Phung Van Dong (Institute of Physics, VAST)
- Ho Trung Dung (Ho Chi Minh city Institute of Physics)
- Vu Ngoc Tuoc (Hanoi University of Technology)

Proceedings

- Nguyen Tri Lan (Institute of Physics, VAST, Hanoi)

Workshop

Organizing Institutions

- Institute of Physics, Vietnam Academy of Science and Technology (IOP-VAST)
- College of Science, Vietnam National University, Hanoi (HUS-VNU)

Chair

- Nguyen Ai Viet (Institute of Physics, VAST, Hanoi)

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- Pierre Darriulat (Institute of Nuclear Science and Technology, Hanoi)
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Program Committee

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- Nguyen Quynh Lan (Hanoi National University of Education, Hanoi)

- Phan Bao Ngoc (International University, Ho Chi Minh city)

- Dinh Van Trung (Institute of Physics, VAST, Hanoi)

Proceedings

- Nguyen Tri Lan (Institute of Physics, VAST, Hanoi)

Sponsors

- Institute of Physics, Vietnam Academy of Science and Technology (IOP-VAST)

- Vietnam Academy of Science and Technology (VAST)

- Asia Pacific Center for Theoretical Physics (APCTP) – *for workshop only*

- College of Science, Vietnam National University, Hanoi (HUS-VNU)

General Information

Location

The conference and the workshop take place in:

Dakruco Hotels
30 Nguyen Chi Thanh
Buon Ma Thuot, Dak Lak, Viet Nam.
Tel: (84-500) 3970777 - Fax: (84-500) 3970889
http://www.dakrucohotel.com

The Dakruco Hotels are located on the East gateway of Buon Ma Thuot, and is at a distance of about 7.5 km from Buon Ma Thuot airport.

Direction

Buon Ma Thuot has a domestic airport, with flight connections to Hanoi, Ho Chi Minh city, and Da Nang.

The most convenient way to transport from the airport to the conference and vice versa is by taxi.

Instructions for Speakers

Speakers are requested to be present in their respective section room at least 10 minutes prior to the commencement of each section.

The duration of an invited presentation is 30 and 35 minutes in the conference and the workshop, respectively. This includes 25 and 30 minutes for the presentation itself and 5 minutes for Q&A. The duration of a regular presentation is 20 minutes. This includes 17 minutes for presentation itself and 3 minutes for Q&A. We would appreciate it if all presenters can adhere strictly to these time limits.

Speakers should bring their own laptop ready for presentation. Laptop needs to be checked with the projector to be sure it is working before the session starts. No overhead projectors will be made available.

Instructions for Session Chairs

Please be aware of the time frame designated to each presenter, and warn the presenters as follows:

- Invited talk: first warning at 20 minutes, second warning at 25 minutes (for the conference) first warning at 25 minutes, second warning at 30 minutes (for the workshop).

- Regular talk: first warning at 15 minutes, second warning at 17 minutes (for both the conference and the workshop).

Instructions for Posters

Two poster sessions of the conference will be held during 10:30 - 12:00 AM and 14:00 - 15:30 PM on July 28th and July 30th, respectively, at the Ballroom Lobby.

One poster session of the workshop will be held during 10:30 - 12:00 AM on July 30 at the Ballroom Lobby.

Poster should be hanged on poster standy with correct presentation code as given in the abstract book. At least, the corresponding author of the poster should be present during poster session.

Meeting Rooms

- **Ballroom**: all conference sessions, VTPS meeting.

- **Champa**: all workshop sessions.

Program Sketch

Conference Program

Time	Monday July 28	Tuesday July 29	Wednesday July 30	Thursday July 31
08h30 - 10h00	Registration Opening (9h40) *(Chair: T. X. Hoang)*	No activity	T. X. Hoang (I.2) B. T. Cong (O.12) D. Son (O.13) *(Chair: V. N. Tuoc)*	No activity
10h00 - 10h30	Coffee break			
10h30 - 12h00	D. V. Duc (I.1) D. V. Duc (O.1) N. S. Han (O.2) *(Chair: N. A. Viet)*	Poster Session 1 *(Chair: N. T. Lan)*	P. V. Nham (I.3) N.T.K. Thanh (O.14) P. D. Khuong (O.15) *(Chair: T. M. Tien)*	No activity
12h00 - 14h00	Lunch break			
14h00 - 15h30	H. A. Tuan (O.3) P. T. Vinh (O.4) B. T. Hoc (O.5) *(Chair: B. T. Cong)*	V. N. Tuoc (O.9) N.T.T. Nhung (O.10) L. B. Ho (O.11) *(Chair: H. A. Tuan)*	Poster Session 2 *(Chair: P. V. Nham)*	No activity
15h30 - 16h00	Coffee break			
16h00 - 17h30	H. Mineo (O.6) N. N. Ty (O.7) V. V. Vien (O.8) *(Chair: L. V. Hoang)*		Excursion (from 15h30)	VTPS Meeting (from 15h45) *(Chair: N. A. Viet)*

Workshop Program

Time	Monday July 28	Tuesday July 29	Wednesday July 30	Thursday July 31
08h30 - 10h00	No activity	Registration Opening (9h20) D. V. Trung (O.1) *(Chair: N. A. Ky)*	M. Sasaki (I.7) N. T. Hien (I.8) J. Tandean (O.5) *(Chair: J. O. Gong)*	G. Adam (I.11) M. Nomachi (I.12) L. H. Khiem (O.7) *(Chair: T. C. Yuan)*
10h00 - 10h30	Coffee break			
10h30 - 12h00	No activity	J. M. Frère (I.1) T. Konno (I.2) D. N. Dinh (O.2) *(Chair: P. Q. Hung)*	Poster Session *(Chair: N. Q. Lan)*	Y. Kurihara (I.13) G. Belanger (I.14) N. Phan-Bao (O.8) *(Chair: G. Adam)*
12h00 - 14h00	Lunch break			
14h00 - 15h30	Early Registration	G. Ban (I.3) Y. Itoh (I.4) N. Q. Hung (O.3) *(Chair: J. M. Frère)*	J. O. Gong (I.9) P. Q. Hung (I.10) L. M. Tan (O.6) *(Chair: M. Sasaki)*	T. C. Yuan (I.15) P. Darriulat (I.16) *(Chair: G. Belanger)* Closing
15h30 - 16h00	Coffee break			
16h00 - 17h30	Early Registration	T. Tanabe (I.5) N. D. Dang (I.6) S. Chakraborty (O.4) *(Chair: P. Darriulat)*	Excursion (from 15h30)	VTPS Meeting (from 15h45) *(Chair: N. A. Viet)*

Excursion

An excursion to D'ray Sap Waterfall is planned on Wednesday, July 30, starting from 15h30 PM till late evening. The excursion is free for all conference/workshop participants and includes a dinner barbecue.

VTPS Meeting

The meeting of the Vietnamese Theoretical Physics Society (VTPS) will be held in the last session of the conference, on July 31, in Dakruco Hotels **Ballroom**.

This year meeting will be featured by two talks besides a regular meeting:

- **"East and West in Me"** (given in English)
  Time: 15h45 - 16h30
  Speaker: Nguyen Dinh Dang.

  The speaker, who is a physicist cum artist, member of Vietnam Fine-Arts Association and member of Subject Art Association of Japan, will talk about the blending of eastern and western cultures in his oil paintings.

- **Regular meeting:**
  Time: 16h30 - 16h45
  Includes giving the VTPS's Young Research Award to Dr. Phan Van Nham (Duy Tan University).

- **"Phải chăng đã đến thời kỳ chuyển đổi từ Song Ngư sang Bảo Bình"**
  Time: 16h45 - 17h30
  Speaker: Chu Hao.

Conference Program

Monday, 28-07-2014

08h30 - 09h40	Registration
09h40 - 10h00	Opening
10h00 - 10h30	Coffee Break

Oral Session 1
Chair: Nguyen Ai Viet

10h30 - 11h00   I.1 – Invited

Time-like Extradimensions and Tachyon-like Particles

Dao Vong Duc (Institute of Physics, VAST)

11h00 - 11h20   O.1 – Oral

Extradimensions, Deformed Gauge Invariance and Mass of Gauge Bosons

Dao Vong Duc (Institute of Physics, VAST)

11h20 - 11h40   O.2 – Oral

High energy scattering of Dirac particles on smooth potentials

Nguyen Suan Han (ĐHKH Tự Nhiên - ĐHQG Hà Nội)

12h00 - 14h00   Lunch Break

Oral Session 2
Chair: Bach Thanh Cong

14h00 - 14h20   O.3 – Oral

Coherent Potential Approximation Study of the Mott Transition in Optical Lattice System with Site-dependent Interactions

Hoang Anh - Tuan (Institute of Physics, Hanoi)

14h20 - 14h40   O.4 – Oral

                       Phonon – assisted cyclotron resonance in quantum well with semi – inverse
                       potential via two – photon absorption process

                       Phạm Tuấn Vinh (Dong Thap University)

14h40 - 15h00   O.5 – Oral

                       Temperature-Dependent Transport in locally gated graphene bipolar junc-
                       tions

                       Bùi Thái Học (Faculty of Physics, VNU University of Science)

15h30 - 16h00   Coffee Break

Oral Session 3
Chair: Le Van Hoang

16h00 - 16h20   O.6 – Oral

                       Coherent Pi-Electron Rotations in a Nonplanar Chiral Aromatic Molecule

                       Hirobumi Mineo (Institute of atomic and molecular science)

16h20 - 16h40   O.7 – Oral

                       Quá trình ion hóa hai điện tử của H2 dao động

                       Nguyen Ngoc Ty (Đại học Sư phạm Tp. HCM)

16h40 - 17h00   O.8 – Oral

                       Neutrino mass and mixing in the 3-3-1 model based on D4 flavor symmetry

                       Viên Văn Võ (Tay Nguyen University, 567 Le Duan Street, Buon Ma Thuot
                       City, Dak Lak Province, Viet Nam)

Tuesday, 29-07-2014

Poster Session 1
Chair: Nguyen Tri Lan

10h30 - 12h00   P.1 – Poster

                       The influence of turbulent velocity in the circumstellar envelope on the maser
                       line profile

                       Trần Ngọc Hưng (Institute of Physics, VAST)

10h30 - 12h00   P.2 – Poster

                       The statistical distribution for (q,R)-deformed crystal lattice vibration for
                       generic atomic string

Nguyen Thi Ha Loan (Hanoi Pedagogical University No.2)

10h30 - 12h00   P.3 – Poster

Influence of phonon confinement on the optically-detected magneto-phonon resonance line-width in quantum wells

Tran Cong Phong (Ministry of Education and Training)

10h30 - 12h00   P.4 – Poster

Neutrino mixing and CP violation in 3-3-1 model with S4 flavor symmetry

Viên Văn Võ (Tay Nguyen University, 567 Le Duan Street, Buon Ma Thuot City, Dak Lak Province, Viet Nam)

10h30 - 12h00   P.5 – Poster

Influence of a Strong Electromagnetic Wave (Laser Radiation) on the Hall Effect in a Cylindrical Quantum Wires with Infinitely High Potential

Nguyen Thu Huong (Academy of Air Defense and Air Force)

10h30 - 12h00   P.6 – Poster

THE INFLUENCE OF CONFINED ACOUSTIC PHONONS ON THE RA-DIOELECTRIC FIELD IN A QUANTUM WELL

Do Tuan Long (Faculty of Physics, Hanoi University of Science, Vietnam National University)

10h30 - 12h00   P.7 – Poster

THE INFLUENCE OF ELECTROMAGNETIC WAVE ON THE MAGNE-TORESISTANCE IN DOPED SUPERLATTICE

Nguyen Dinh Nam (Faculty of Physics, Hanoi University of Science, Vietnam National University)

10h30 - 12h00   P.8 – Poster

Dependence of Hall coefficient on Amplitude of an External Electromafnetic Wave in a Compositional Semiconductor Superlattice

Hoi Dinh Bui (Department of Physics, National University of Civil Engineering)

10h30 - 12h00   P.9 – Poster

EFFECT OF THE ELECTRIC FIELD ON A HYDROGENIC IMPURITY IN A T-SHAPED QUANTUM WIRE

Dang Van Quan (Ho Chi Minh City Institute of Physics)

10h30 - 12h00   P.10 – Poster

AMPLITUDE AND PHASE DYNAMICS OF SPIN-DEGENERATED PO-LARITON CONDENSATE IN SEMICONDUCTOR QUANTUM WIRE

Dang Van Quan (Ho Chi Minh City Institute of Physics)

10h30 - 12h00   P.11 – Poster

Quantum kinetic derivation of the nonequilibrium Gross-Pitaevskii equation for nonresonant excitation of microcavity polaritons

Doan Tri Dung (Ho Chi Minh City Institute of Physics)

10h30 - 12h00   P.12 – Poster

Heisenberg antiferromagnetic spin S=1/2 chain Ca2CuO3, a covalent or charge transfer insulator?

Nguyen Thuy Trang (Faculty of Physics, VNU University of Science, Hanoi)

10h30 - 12h00   P.13 – Poster

Quantum confinement in a parabolic quantum well based on polar materials

Pham Thi Bich Thao (Can Tho University)

10h30 - 12h00   P.14 – Poster

Second quantization model of surface plasmon polariton in metal planar surface

Dao Thi Thuy Nga (Han Thuyen High School)

10h30 - 12h00   P.15 – Poster

Density fluctuations in amorphous and liquid MgO

Đinh Thị Hải Hà (Đại học Sư phạm Hà Nội 1)

10h30 - 12h00   P.16 – Poster

The effective interaction of charged particles with contribution of exchange massless and massive bosons

Nguyễn Trí Lân (Institute of Physics, VAST)

10h30 - 12h00   P.17 – Poster

Cyclotron-Phonon Resonance in Monolayer Graphene

Huỳnh Vĩnh Phúc (Dong Thap University)

10h30 - 12h00   P.18 – Poster

Surface Oxide Formation on Pt Cathode of Proton Exchange Membrane Fuel Cells: Effects of Reaction Intermediates

Do Son (Ho Chi Minh City University of Technology)

12h00 - 14h00   Lunch Break

Oral Session 4
Chair: Hoang Anh Tuan

14h00 - 14h20	O.9 – Oral

Density Functional Based Tight Binding Study on Photoelectronic Processes at Porphyrin Dye/ZnO/ZnS Core/shell Nanowire Heterostructures in Dye-Sensitized Solar Cells

Vu Ngoc Tuoc (Hanoi University of Science and Technology)

14h20 - 14h40	O.10 – Oral

Fock-Darwin energy spectrum of the gate-tunable circular graphene quantum dots

Nguyễn Thị Thuỳ Nhung (Institute of Physics, VAST)

14h40 - 15h00	O.11 – Oral

Half-metallicity in hybrid Boron-Nitride/Graphene nanoribbon with 5-8-5 topological line defect

Le Bin Ho (Ho Chi Minh City Institute of Physics)

Wednesday, 30-07-2014

Oral Session 5
Chair: Vu Ngoc Tuoc

08h30 - 09h00	I.2 – Invited

Elasticity, long-range interactions and the toroidal condensate of semiflexible polymers

Trịnh Xuân Hoàng (Institute of Physics, VAST)

09h00 - 09h20	O.12 – Oral

Properties of a monolayer magnetic film with dipolar interaction

Bach Thanh Cong (Faculty of Physics, VNU University of Science)

09h20 - 09h40	O.13 – Oral

Oxygen Reduction Reactivity of PdCo Alloy upon Co Content

Do Son (Ho Chi Minh City University of Technology)

10h00 - 10h30	Coffee Break

Oral Session 6
Chair: Tran Minh Tien

10h30 - 11h00	I.3 – Invited

Valence fluctuation mediation on superconductivity in heavy fermion systems

Phan Van Nham (Institute of Research and Development, Duy Tan University)

11h00 - 11h20	O.14 – Oral

Magnetically controlled thermoelectric transport through Kondo quantum dot with spin-orbit interaction

Nguyen Thi Kim Thanh (Institute of Physics, VAST)

11h20 - 11h40	O.15 – Oral

Influence of nonlinearity on the optical Tamm plasmon polaritons in one dimensional photonic crystal structures.

Phung Duy Khuong (Institute of Physics, VAST)

12h00 - 14h00	Lunch Break

Poster Session 2
Chair: Phan Van Nham

14h00 - 15h30	P.19 – Poster

Retrieval of interatomic separation from high-order harmonic spectra using the electron interference effect

Le Thi Cam Tu (HCMC University of Pedagogy)

14h00 - 15h30	P.20 – Poster

Investigation of thermodynamic properties of metal thin film by statistical moment method

Duong Dai Phuong (Doan 871, Bo Quoc Phong)

14h00 - 15h30	P.21 – Poster

ẢNH HƯỞNG CỦA DAO ĐỘNG HẠT NHÂN LÊN PHỔ PHÁT XẠ SÓNG ĐIỀU HOÀ BẬC CAO CỦA PHÂN TỬ H2+

Phan Thị Ngọc Loan (Khoa Vật lý, Đại học sư phạm thành phố Hồ Chí Minh)

14h00 - 15h30	P.22 – Poster

ẢNH HƯỞNG CỦA DAO ĐỘNG HẠT NHÂN LÊN QUÁ TRÌNH ION HOÁ PHÂN TỬ H2+

Truong Thi Tran Chau (Khoa Khoa học cơ bản, Đại học Sư phạm Kỹ thuật TP HCM)

14h00 - 15h30   P.23 – Poster

Exact numerical wave functions for a molecular model with two charged nuclei and ab initio calculations of ionization of polar molecules

Hoàng Đỗ Ngọc Trầm (Ho Chi Minh City University of Pedagogy)

14h00 - 15h30   P.24 – Poster

THE GENERAL SOLUTION OF BACKWARD DIFFUSION EQUATION

Vu Ba Dung (Hanoi university of Mining and Geology)

14h00 - 15h30   P.25 – Poster

Analysis the UV-Spectra of Neurglobin Based on Two-Optical Model

To Thi Thao (Institute of Physics)

14h00 - 15h30   P.26 – Poster

A model of optical trapping cold atoms by using surface plasmon effect with singularities generated by evanescence Bessel beams

Nguyen Thi Phuong Lan (Hanoi Pedagogical University No.2)

14h00 - 15h30   P.27 – Poster

Moon tide and the origin of life

Nguyễn Thị Thu Nguyệt (Đại học Hải Phòng)

14h00 - 15h30   P.28 – Poster

Tide-money hypothesis and crisis of stock exchange market

Nguyễn Thị Thu Nguyệt (Đại học Hải Phòng)

14h00 - 15h30   P.29 – Poster

A simple interface shell model for core parts of soft spherical particles and virus

Bùi Thị Lệ Quyên (Thai Binh University of Medical and Pharmacy)

14h00 - 15h30   P.30 – Poster

Effective mass of photon in liquid water environment of life and soft maters

Bùi Thị Lệ Quyên (Thai Binh University of Medical and Pharmacy)

14h00 - 15h30   P.31 – Poster

Q-deformed harmonic oscillator and Morse-like aharmonic potential

Ngo Gia Vinh (Bac Ninh Department of Education and Traning)

14h00 - 15h30   P.32 – Poster

First, second quantizations and q-deformed harmonic oscillator

Man Van Ngu (Hung Yen Industrial Colleage)

14h00 - 15h30   P.33 – Poster

General auto catalytic theory and simple model of financial markets

Chu Thuy Anh (Institute of Physics, VAST)

14h00 - 15h30   P.34 – Poster

Simple grading model for financial markets

Chu Thuy Anh (Institute of Physics, VAST)

14h00 - 15h30   P.35 – Poster

Temperature dependent magnetization of the two band model for diluted magnetic semiconductors

Hoang Anh - Tuan (Institute of Physics, Hanoi)

14h00 - 15h30   P.36 – Poster

Effects of Macromolecular Crowding on Protein Folding

Bui Phuong Thuy (Nam Dinh University of Technology Education)

14h00 - 15h30   P.37 – Poster

Aggregation of peptides in the tube model with correlated sidechain orientations

Nguyễn Bá Hưng (Vietnam Military Medical University)

14h00 - 15h30   P.38 – Poster

Edge states in a correlated Chern insulator

Nguyễn Hồng Sơn (Trường Đại học Công đoàn)

14h00 - 15h30   P.39 – Poster

Size dependent melting of Silicon nanoparticles

Nguyễn Thị Thúy Hằng (Đại Học Bách Khoa, ĐHQG HCM)

15h30 - 21h00   Excursion

Thursday, 31-07-2014

15h45 - 17h30   VTPS Meeting

Workshop Program

Tuesday, 29-07-2014

08h30 - 09h30   Registration

Oral Session 1
Chair: Nguyen Anh Ky

09h30 - 09h40   Opening

09h40 - 10h00   O.1 – Oral

Radiative transfer modeling and its applications in probing the physical conditions of stellar environments

Dinh Van Trung (Institute of Physics, VAST)

10h00 - 10h30   Coffee Break

Oral Session 2
Chair: Pham Quang Hung

10h30 - 11h05   I.1 – Invited

Masses, mixings and Majorana from 6D

Jean-Marie Frère (Université de Libre de Bruxelles, Bruxelles)

11h05 - 11h40   I.2 – Invited

Status and prospects of the Belle II experiment

Tomoyuki Konno (Belle-2 collaboration, and Tokyo Metropolitan University)

11h40 - 12h00   O.2 – Oral

Radiative emission of neutrino pairs in atom and light sterile neutrinos

Dinh Nguyen Dinh (Institute of Physics, Hanoi)

12h00 - 14h00   Lunch Break

Oral Session 3
Chair: Jean-Marie Frère

14h00 - 14h35   I.3 – Invited

Neutron Electric Dipole Moment Search at the Paul Scherrer Institute

Gilles Ban (Université de Caen Basse-Normandie)

14h35 - 15h10   I.4 – Invited

Status of KAGRA and gravitational wave astronomy

Yousuke Itoh (Research center for the early universe School of Science, University of Tokyo)

15h10 - 15h30   O.3 – Oral

Pairing reentrance phenomenon in hot rotating nuclei

Nguyen Quang Hung (Tan Tao University)

15h30 - 16h00   Coffee Break

Oral Session 4
Chair: Pierre Darriulat

16h00 - 16h35   I.5 – Invited

Physics at the ILC and progress towards its realization

Tomohiko Tanabe (The University of Tokyo)

16h35 - 17h10   I.6 – Invited

Recent achievements in the study of thermal pairing and giant resonances in highly excited nuclei

Nguyen Dinh Dang (RIKEN, Wako city)

17h10 - 17h30   O.4 – Oral

Higgs boson mass, neutrino masses and mixing and 7 keV sterile neutrino dark matter in a $U(1)_R$ lepton number model

Chakraborty Sabyasachi (Indian Association for the Cultivation of Science)

Wednesday, 30-07-2014

Oral Session 5
Chair: Jinn-Ouk Gong

08h30 - 09h05   I.7 – Invited

Cosmic inflation and its predictions

Misao Sasaki (YITP, Kyoto University, Kyoto)

09h05 - 09h40   I.8 – Invited

The BICEP2 Experiment and Result

Nguyen Trong Hien (Jet Propulsion Laboratory, CALTECH, Pasadena)

09h40 - 10h00   O.5 – Oral

Enhanced Electron EDM with Minimal Flavor Violation

Tandean Jusak (National Taiwan University)

10h00 -10h30   Coffee Break

Poster Session
Chair: Nguyen Quynh Lan

10h30 - 12h00   P.1 – Poster

Pre-inflation fluctuations in a Open ΛCDM model

Nguyen Quynh Lan (Hanoi National University of Education)

10h30 - 12h00   P.2 – Poster

Ionization of polar molecules by intense laser fields

Hoàng Văn Hưng (Khoa Vật Lý - Trường Đại Học Sư Phạm Thành Phố Hồ Chí Minh)

10h30 - 12h00   P.3 – Poster

The Metric Of Extended Einstein Equation and Schwarzschild Solutions In Six Dimensions

Phan Hong Lien (LeQuyDon Academy of Technology)

10h30 - 12h00   P.4 – Poster

OPERATION AND RESEARCH ACTIVITIES AT THE HUS 5SDH-2 TANDEM ACCELERATOR FACILITY

Vi Ho Phong (Hanoi University of Science)

10h30 - 12h00   P.5 – Poster

ELEMENTAL ANALYSIS BY TTPIXE METHOD AT THE HUS 5SDH-2 TANDEM ACCELERATOR SYSTEM

Vi Ho Phong (Hanoi University of Science)

10h30 - 12h00   P.6 – Poster

Gravitational Waves from Binary Neutron Stars

Nguyen Quynh Lan (Hanoi National University of Education)

10h30 - 12h00   P.7 – Poster

Neutrino masses and mixing in an extended standard model with an A4 flavour symmetry.

Phi Quang Van (Institute of Physics, VAST)

10h30 - 12h00   P.8 – Poster

The formation mechanism of the coldest stars in the Universe

Phan-Bao Ngoc (HCM International University - Vietnam National University)

10h30 - 12h00   P.9 – Poster

24TH THE ACTIVITY CYCLE OF THE SUN SURVEYING

Tran Quoc Ha (HCMc University of Pedagogy)

10h30 - 12h00   P.10 – Poster

Latest results on the Higgs boson discovery and investigation at the ATLAS - LHC

Nguyen Anh Ky (Institute of Physics, VAST)

12h00 - 14h00   Lunch Break

Oral Session 6
Chair: Misao Sasaki

14h00 - 14h35   I.9 – Invited

Echoes from the past

Jinn-Ouk Gong (Asia Pacific Center for Theoretical Physics (APCTP), Pohang)

14h35 - 15h10   I.10 – Invited

Electroweak-scale seesaw mechanism and its experimental implications for the LHC and ILC

Pham Quang Hung (University of Virginia, Charlottesville)

15h10 - 15h30   O.6 – Oral

Development of TNU-SuperSID teaching module for observing the effects of solar activities on the Earth's lower ionosphere

Le Minh Tan (Department of Physics, Faculty of Natural Science and Technology, TayNguyen University)

15h30 - 21h00   Excursion

Thursday, 31-07-2014

Oral Session 7
Chair: Yoshimasa Kurihara

08h30 - 09h05	I.11 – Invited
	Handling accuracy in Bayesian automatic adaptive quadrature
	Gheorghe Adam (Joint Institute for Nuclear Research, Dubna)

09h05 - 09h40	I.12 – Invited
	Computer applications in nuclear and particle physics experiments
	Masaharu Nomachi (University of Osaka)

09h40 - 10h00	O.7 – Oral
	CALCULATION FOR OPTIMIZATION OF THE EXPERIMENTAL CONDITIONS FOR RBS ANALYSIS AT THE HUS 5SDH-2 TANDEM ACCELERATOR
	Le Hong Khiem (Institute of Physics, VAST, Hanoi)

10h00 - 10h30	Coffee Break

Oral Session 8
Chair: Tzu Chiang Yuan

10h30 - 11h05	I.13 – Invited
	Automatic Calculation Systems for High Energy Physics
	Yoshimasa Kurihara (KEK, Tsukuba)

11h05 - 11h40	I.14 – Invited
	Dark matter and the Higgs
	Genevieve Belanger (LAPTH, Annecy)

11h40 - 12h00	O.8 – Oral
	Lithium detection in young, nearby brown dwarfs
	Ngoc Phan-Bao (HCM International University - Vietnam National University)

12h00 - 14h00	Lunch Break

Oral Session 9
Chair: Genevieve Belanger

14h00 - 14h35   I.15 – Invited

Dark U(1)

Tzu Chiang Yuan (Institute of Physics, Academia Sinica)

14h35 - 15h10   I.16 – Invited

Nuclear- Particle- and Astro-physics: Which choice for Viet Nam?

Pierre Darriulat (Institute of Nuclear Science and Technology, Hanoi)

15h10 - 15h30   Closing

15h30 - 15h45   Coffee Break

15h45 - 17h30   VTPS Meeting

Conference Abstracts

I.1 – Invited, NCTP-39

Time-like Extradimensions and Tachyon-like Particles

Dao Vong Duc

Institute of Physics, Vietnam Academy of Science and Technology, Hanoi, Vietnam

In this work we extend the results obtained in our previous works (Journal of Physical Science and Application, vol. 4, N.1, p.60, 2014; Journal of Modern Physics, vol.5, N.6, 2014), where a mechanism has been proposed for mass creation from Extradimensions. It holds that the existence of tachyon-like particles is a direct consequence of the presence and the compactification of time-like Extradimensions. Besides scalar tachyon as in Superstring theory tachyons with spin is also theoretically possible.

Presenter: Dao Vong Duc

I.2 – Invited, NCTP-39

Elasticity, long-range interactions and the toroidal condensate of semiflexible polymers

Trinh Xuan Hoang, Trinh Lan Hoa, Nguyen Thanh Hai

Institute of Physics, Vietnam Academy of Science and Technology, Hanoi, Vietnam

We consider various forms of the elastic bending energy, surface potential and long range interactions between segments for semiflexible polymers and study the competition between the toroidal and the rod-like conformations as possible ground states of DNA in a bad solvent. The long-range interactions driving the DNA condensation are assumed to be of the form pertaining to the attractive depletion potential as well as the attractive counterion induced soft potential. In the stiffness-length plane we find a transition from rod-like to toroid condensates for increasing stiffness at a fixed chain length L. The transition line is found to have a L^λ dependence where the exponent λ depends solely on the form of the elastic potential ($\lambda = 1/3$ for the worm-like chain), and does not depend on the details of the long-range interaction between neighboring segments. We also find a complete disappearance of the rod-like condensate for any chain length when the elastic potential is sufficiently soft. When realistic DNA parameters are used, our description reproduces rather well some of the experimental features observed in DNA condensates.

Presenter: Trịnh Xuân Hoàng

I.3 – Invited, NCTP-39

Valence fluctuation mediation on superconductivity in heavy fermion systems

Phan Van Nham (1), Klaus W. Becker (2)

(1) Institute of Research and Development, Duy Tan University, Vietnam (2) Institute for Theoretical Physics, Technical University of Dresden, Germany

Recently, it was claimed that valence fluctuations might be responsible for the formation of a superconducting phase which was found in Ce based heavy-fermion systems under high pressure. Such a phase is investigated for the extended periodic Anderson model in two-dimensions in the framework of the projector-based renormalization method, In this model, an additional local Coulomb repulsion Ufc between the f- and conduction electrons in included. We derive self-consistent equations for the superconducting order parameters which show dominant d-wave symmetry for values of the model parameters close to the valence transition regime.

Presenter: Phan Van Nham

O.1 – Oral, NCTP-39

Extradimensions, Deformed Gauge Invariance and Mass of Gauge Bosons

Dao Vong Duc

Institute of Physics, Vietnam Academy of Science and Technology, Hanoi, Vietnam

This work is dedicated to the problems concerning the originality ol gauge boson mass. It is based on the results obtained in our recent works (arXiv-hepth/1301.1405, 2013; Journal of Modern Physics, vol.4, p.991, 2013; US Open Advanced Physics Journal, vol.1, N.1,p.1, 2014), where a mechanism for space-time dependence of gauge coupling constant has been proposed with the concept of deformed gauge invariance. This mechanism also allows gauge bosons to acquire mass. On the other hand, it has been shown that the existence and the compactification of Extradimensions are the origin for particle mass in ordinary 4-dimensional space-time.

Presenter: Dao Vong Duc

O.2 – Oral, NCTP-39

High energy scattering of Dirac particles on smooth potentials

Nguyen Suan Han (1), Nguyen Nhu Xuan (2), Vu Toan Thang (3)

(1) Department of Theoretical Physics, University of Science, 334 Nguyen Trai, Thanh Xuan, Hanoi, Vietnam, Lienbat76@gmail.com; (2) Department of Physics, Le Qui Don Technical University,100 Hoang Quoc Viet, Cau Giay, Hanoi, Vietnam, Xuannn@mta.edu.vn; (3) Faculty of Basic Science - The Military Engineer Officer College, 229 Bach Dang ,Thu Dau Mot, Binh Duong,vuthang76@gmail.com.

An eikonal representation is deduced for high energy scattering amplitude of Dirac particles on smooth potentials. The consideration is carried out in the two-component description, and also with aid of Dirac equation.

Presenter: Nguyen Suan Han

O.3 – Oral, NCTP-39

Coherent Potential Approximation Study of the Mott Transition in Optical Lattice System with Site-dependent Interactions

Le Duc Anh (1), Tran Thi Thu Trang (1,2), Hoang Anh Tuan (3)

(1) Hanoi National Universiy of Education (2) Quang Ninh Teacher Training College (3) Institute of Physics, VAST

We study the Mott transition in the half-filled Hubbard model with spatially alternating interactions by means of the coherent potential approximation. The phase boundary between metallic and insulating phases at zero temperature is derived and the nature of the Mott states is also considered. Our results are in good agreement with the ones recently obtained by the two-site dynamical mean-field theory.

Presenter: Hoang Anh - Tuan

O.4 – Oral, NCTP-39

Phonon – assisted cyclotron resonance in quantum well with semi – inverse potential via two – photon absorption process

Le Dinh (1), Luong Van Tung and Pham Tuan Vinh (2)

(1) Department of Physics and Center for Theoretical and Computational Physics, Hue University's College of Education, Hue, Viet Nam. (2) Department of Physics, Dong Thap University, Dong Thap, Viet Nam.

Phonon – assisted cyclotron resonance (PACR) in the semi – inverse potential quantum well is investigated via two – photon absorption process when electrons are scattered by LO – phonon. Using the Green's function method, we obtain the expression of absorption power in the case of one and two – photon absorption. The dependence of absorption power on frequency with different values of temperature, magnetic field and well width is indicated. Besides, we obtain PACR – linewith as profiles of the curves by using profile method. The temperature and magnetic field dependence of the PACR – linewidth is investigated. The results are compared those in the quantum well models with different types of confined potentials.

Presenter: Phạm Tuấn Vinh

O.5 – Oral, NCTP-39

Temperature-Dependent Transport in locally gated graphene bipolar junctions

T.Hoc Bui (1), D.Quang To (2)

(1) VNU University of Science, faculty of Physics, 334 Nguyen Trai, Thanh Xuan, Ha Noi, Viet Nam; (2) Center for Computational Physics, Institute of Physics, VAST, Ha Noi, Viet Nam

We study the temperature-dependent transport in locally gated graphene bipolar junctions using model of Gaussian-type potential was suggested by Nhung T T Nguyen et al 2014 J. Phys.: Condens. Matter 26 015301 . Using this model we study the resistance, current-voltage characteristics, and shot noise for locally gated graphene bipolar junction under varying temperature. Our results describe well experimental data obtained by Jairo Velasco Jr et al 2009 New J. Phys. 11 095008.

Presenter: Bùi Thái Học

O.6 – Oral, NCTP-39

Coherent Pi-Electron Rotations in a Nonplanar Chiral Aromatic Molecule

H. Mineo (1), S.H. Lin (1,2), and Y. Fujimura (3)

(1) Institute of Atomic and Molecular Sciences, Academia Sinica, Taipei 106, Taiwan; (2) Department of Applied Chemistry, Institute of Molecular Science, Hsin-Chu 300, Taiwan; (3) Department of Chemistry, Graduate School of Science, Tohoku University, Sendai 980-8578, Japan

The π electrons in aromatic rings are considered to play an important role for organic electronics. Research on electrodynamics in molecular systems have been accelerated by recent developments of laser technology. There have also been theoretical studies of π-electron dynamics control in aromatic ring molecules by UV laser pulses. The π-electron ring current in Mg-porphyrin are induced by a few cycle of circularly polarized (CP) UV laser pulse. Here photon angular momentum is transferred to degenerated electronic excited states by circularly polarized laser pulse. The linearly polarized (LP) UV laser pulse is also used to create π-electron ring current in 2,5-dichloro[n](3,6) pyrazinophane, which is a chiral molecule and has no degenerate electronic excited states. The π-electron ring currents are created by coherent excitation of a pair of quasi-degenerate electronic excited states.

In this work we use (P)-2,2'-biphenol, which is a typical nonplanar chiral aromatic molecule with axial chirality. The time-dependent coherent ring currents and angular momentum were calculated using the density matrix theory based on the LCAO MO approximation. The results of the numerical simulation of coherent-electron ring currents and angular momentum in (P)-2,2'-biphenol are shown. We also propose an ultrafast quantum switching method of π-electron rotations and perform the sequential switching among four rotational patterns which are performed by the overlapped pump-dump laser pulses with properly selected laser polarizations, time delay and relative phases.

Presenter: Hirobumi Mineo

O.7 – Oral, NCTP-39

Quá trình ion hóa hai điện tử của H2 dao động

Lê Thị Thu Thủy, Nguyễn Ngọc Ty

Khoa vật lý, Đại học Sư phạm, TP. HCM 280 An Dương Vương, Quận 5, Tp. HCM

Chúng tôi khảo sát ảnh hưởng của dao động hạt nhân lên quá trình ion hóa hai điện tử của phân tử H2 trong trường laser cường độ cao xung cự ngắn bằng phương pháp TDSE. Kết quả cho thấy quá trình không liên tục đóng vai trò chủ đạo trong cơ chế ion hoa hai điện tử. Xác suất ion hóa hai điện tử tăng dần theo thời gian và đạt đến giá tri bão hòa. Quan trọng hơn, khi so sánh với mô hình hạt nhân đứng yên, chúng tôi nhận thấy xác suất ion hóa từ phân tử đang dao động luôn luôn lớn hơn và nếu quá trình ion hóa xảy ra từ một mức dao động cao sẽ có xác suất lớn hơn từ một mức thấp.

Presenter: Nguyen Ngoc Ty

O.8 – Oral, NCTP-39

Neutrino mass and mixing in the 3-3-1 model based on D4 flavor symmetry

Vo Van Vien (1), Hoang Ngoc Long (2) and Tran Dinh Tham (3)

(1): Department of Physics, Tay Nguyen University, 567 Le Duan, Buon Ma Thuot, Vietnam. (2): Institute of Physics, VAST, 10 Dao Tan, Ba Dinh, Hanoi, Vietnam (3): Pham Van Dong University, 986 Quang Trung Street, Quang Ngai City, Vietnam

We propose a D4 flavor model based on $SU(3)_C \otimes SU(3)_L \otimes U(1)_X$ gauge symmetry responsible for fermion masses and mixings in which all fermion fields act only as singlets under D4. If a $SU(3)_L$ Higgs triplet, lying in $\underline{1}'''$ under D4, is regarded as a perturbation, the corresponding neutrino mass mixing matrix gets the most general form. In this case, the model can fit the most recent data on neutrino masses and mixing with non-zero θ_{13}. The sum of three light neutrino masses and the effective mass governing neutrinoless double beta decay are obtained that consistent with the recent data.

Presenter: Viên Văn Võ

O.9 – Oral, NCTP-39

Density Functional Based Tight Binding Study on Photoelectronic Processes at Porphyrin Dye/ZnO/ZnS Core/shell Nanowire Heterostructures in Dye-Sensitized Solar Cells

Vu Ngoc Tuoc1 , Tran Doan Huan2 , Le Thi Hong Lien1 and Nguyen Thi Thao1

1Institute of Engineering Physics, Hanoi University of Science and Technology, 01 Dai Co Viet Rd., Hanoi 1000, Vietnam 2Institute of Materials Science, University of Connecticut, Storrs, CT 06269-3136 USA

High performance Dye-sensitized solar cells (DSSCs) are very attractive as they are based on inexpensive semiconductor materials, e.g. TiO2, ZnO sensitized to visible light absorption with dyes covalently attached to the semiconductor surface by molecular linkers. Here we report a Density Functional Based Tight Binding (DFTB) study on photo induced electron injection efficiencies from modular assemblies of a Zn-porphyrin dye complex covalently bound to the core/shell nanowire heterostructures of ZnO/ZnS. The band energy alignment, band structure, density of states, and band edge wave functions of this nanowire nano heterostructure in the DSSC are found to depend on the core radius and shell thickness. Nevertheless there always indicated clearly the spatial charge separation in this DSSC system which prevent the charge recombination and thereby increasing the chance of better photovoltaic performance.

Presenter: Vu Ngoc Tuoc

O.10 – Oral, NCTP-39

Fock-Darwin energy spectrum of the gate-tunable circular graphene quantum dots

Nguyễn Thị Thùy Nhung (1), Bùi Thị Hạnh (1)

(1) Theoretical and Computational Physics Department, Institute of Physics, VAST, 10 Dao Tan, Ba Dinh Distr., Hanoi 10000, Vietnam

The energy spectrum of the gate-tunable circular graphene quantum dots in a perpendicular magnetic field is systematically studied. To this end we suggest an alternative model of the

Gaussian confinement potential with the strength U_0 describing the gate voltage and the typical half-width d measuring the dot radius. In the absence of magnetic fields it was shown that despite the Klein tunneling the Gaussian confinement potential can create the quasi-bound states (QBSs) in the sense that their life-time is long enough for practical purposes. For a given dot, i.e. given U_0 and d, the larger the angular momentum m of the state the longer its life-time becomes and, typically, the states with $m \geq 5$ could be well considered as quasi-bound. While the QBS life-time increases as the dot radius reduces, it may be effectively turned by the gate voltage. In the presence of a magnetic field, calculations show the Fock-Darwin energy spectrum for the dots with different d and U_0. In general, magnetic fields enhance the localization of QBSs, the field effects are however depending on not only the value of m but also its sign. In particular, for QBSs with negative angular momenta, the magnetic field may induce the delocalization-localization transition.

Presenter: Nguyễn Thị Thuỳ Nhung

O.11 – Oral, NCTP-39

Half-metallicity in hybrid Boron-Nitride/Graphene nanoribbon with 5-8-5 topological line defect

Tran Nguyen Lan(1,2), Le Bin Ho(1), Tran Hoang Hai(1)

(1) Ho Chi Minh City Institute of Physics VAST, Ho Chi Minh City, Vietnam. (2) The Graduate University for Advanced Studies, Okazaki 444-8585, Japan.

The standard spin-polarized density functional theory calculations have been carried out to study the electronic and magnetic properties of hybrid zigzag boron-nitride/graphene nanoribbons (ZBNCNRs) having B-pair and N-pair line defect at heterojunctions. Our calculation has shown that in contrast to pristine ZBNCNRs, the defective ZBNCNRs exhibit diverse electronics and magnetic properties. It is interesting to find that the defective ZBNCNRs behave as the antiferromagnetic half-semiconductor without regarding the width of graphene section. In the presence of an external electric field, the defective ZBNCNRs exhibit the half-metallic behavior in a certain range of field. The transitions between half-metal <-> metal and half-metal <-> semiconductor have been observed. Band structure, spin density, and charge density have been analyzed in order to understand the calculated results.

Presenter: Le Bin Ho

O.12 – Oral, NCTP-39

Properties of a monolayer magnetic film with dipolar interaction

Bach Thanh Cong, Pham Huong Thao, Bach Huong Giang, Nguyen Thuy Trang

Computational Materials Science laboratory, Faculty of Physics, VNU University of Science

Thermodynamic properties of the monolayer Heisenberg spin lattice film in the external field, and with the nearest neighbor exchange, single ion anisotropy, dipolar interaction are calculated using functional integral representation for free energy. This interacting spin lattice reduces to the non-diagonal anisotropic exchange Heisenberg model and magnetic properties of which such as magnetization, Curie temperature are obtained in Gaussian approximation. Competition between the external field and different kind of interactions leads to the spin-reorientation effect at the critical field strength which is calculated numerically. Comparison with other methods is

also discussed.

Presenter: Bach Thanh Cong

O.13 – Oral, NCTP-39

Oxygen Reduction Reactivity of PdCo Alloy upon Co Content

D. N. Son (1), Ong Kim Le (2), Viorel Chihaia (3), Kaito Takahashi (4)

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(2) College of Natural Sciences, Can Tho University, Campus II, 3/2 Street, Ninh Kieu District, Can Tho City, Vietnam;

(3) Institute of Physical Chemistry "Ilie Murgulescu" of the Roumanian Academy, Splaiul Independentei 202, Sector 6, 060021 Bucharest, Roumania;

(4) Institute of Atomic and Molecular Sciences, Academia Sinica, No. 1, Roosevelt Road, Section 4, P.O. Box 23-166, Taipei, 10617, Taiwan, ROC.

Oxygen reduction reaction (ORR) is an important reaction occurring at the cathode surface of proton exchange membrane fuel cells (PEMFCs). Nevertheless, the slow reaction rate is the main cause for the low performance of these fuel cells. Platinum is the well-known cathode electrocatalyst because of its high performance toward the ORR. However, recent studies have shown that Pt electrocatalyst is not stable under operating conditions of the PEMFCs due to the Pt dissolution caused by the surface oxide formation. On the other hand, Platinum is so expensive that it impedes commercialization of PEMFCs. Alloying is one of the most effective ways to solve the problem of improving the ORR activity and reducing the cost over the well-known but expensive Pt. Among many alloys that have been proposed PdCo alloy appeared as the best candidate, as it has not only higher activity but also higher stability. However, the information on its performance upon varying the Co content is not yet clear. Details of our most recent results on the ORR reactivity of PdCo alloy upon the Co content will be reported at the conference.

Presenter: Do Son

O.14 – Oral, NCTP-39

Magnetically controlled thermoelectric transport through Kondo quantum dot with spin-orbit interaction

Nguyen Thi Kim Thanh and Mikhail Kiselev

Institute of Physics, Vietnam Academy of Science and Technology, 10 Dao-Tan, Hanoi, Vietnam. The Abdus Salam international Centre for Theoretical Physics, Strada Costiera 11, I-34151, Trieste, Italy.

We consider effects of magnetic field on the thermopower of a single-electron transistor based on a quantum dot strongly coupled to one of the leads by a single-mode quantum point contact. We investigate the crossover from a two-channel Kondo effect to a single channel Kondo effect

in Zeeman field for the case of strong spin-orbit (SO) interaction in the quantum point contact. It is shown that at the magnetic field smaller compared to effective field associated with the spin-orbit interaction, the thermo-electric transport depends on an angle between the Zeeman and SO fields allowing fine-tuning of Fermi-liquid to Non-Fermi-liquid crossover by the in-plane magnetic field.

Presenter: Nguyen Thi Kim Thanh

O.15 – Oral, NCTP-39

Influence of nonlinearity on the optical Tamm plasmon polaritons in one dimensional photonic crystal structures.

Phung Duy Khuong

Institute of Physics

We study one-dimensional metal/photonic crystal structures for the excitation of optical Tamm plasmon polaritons, using the invariant imbedding method generalized to nonlinear media, we calculate the reflectance, transmittance and the electromagnetic field distribution inside media exactly. We find that the optical Tamm plasmon polaritons can be observed when the incident angle smaller than the critical angle of total internal reflection. We also find that there is strongly enhanced electromagnetic field intensity compared to those due to normal surface plasmon excitations. The field intensity is enhanced thousand times than at the metal-photonic crystal interface. The optical bistability can be observed for very small values of the intensity of incident wave. We hope that this effect can be designed optical devices which work at much lower threshold light intensities.

Presenter: Phung Duy Khuong

P.1 – Poster, NCTP-39

The influence of turbulent velocity in the circumstellar envelope on the maser line profile

Tran Ngoc Hung, Dinh Van Trung

Institute of Physics

Intense maser emissions by several molecules such as H2O and OH have been commonly observed in the outer region of the expanding circumstellar envelope around evolved stars. High resolution observations indicate that the maser profile has broad double-peak with significant emission at the systemic velocity. In addition, the spatial distribution of the emission is the systemic velocity of the system is also broad. These observational characteristics have been found to be difficult to reproduce with the standard model of the spherically symmetric and smoothly expanding circumstellar envelope. We have carried out large simulations of the maser emissions from circumstellar envelopes which take into account the strong turbulent motion of the gas. The degree of saturation is significantly reduced in the presence of turbulent motion and the double-peaked maser profile is also broadened as expected. Therefore, the large turbulent motion within the circumstellar envelope might provide a viable explanation to the observed characteristics of the maser emission.

Presenter: Trần Ngọc Hưng

P.2 – Poster, NCTP-39

The statistical distribution for (q,R)-deformed crystal lattice vibration for generic atomic string

Nguyen Thi Ha Loan (1), Nguyen Anh Sang (2), Do Thi Thu Thuy (3)

(1,2,3) Hanoi Pedagogical University No.2

The deformed oscillators formalism plays a useful role in the study of physical models. Specifically, many variants of deformed oscillators have been used to study of the quantum optics, condensed matter physics, etc... In this paper we construct a (q,R)- deformed crystal lattice vibration for generic atomic string and calculate statistical distribution of this vibration. This is a fundament for study of crystal lattice vibration, which would give a base for a new quantization procedure.

Presenter: Nguyen Thi Ha Loan

P.3 – Poster, NCTP-39

Influence of phonon confinement on the optically-detected magneto-phonon resonance line-width in quantum wells

Tran Cong Phong (1,2), Le Thi Thu Phuong (2), Tran Dinh Hien (2), Vo Thanh Lam (3)

(1) National Education Union of Viet Nam, 02 Trinh Hoai Duc, Dong Da, Ha noi; (2) Center for Theoretical and Computational Physics, Hue University's College of Education, No. 34, Le Loi Str., Hue City, Viet Nam; (3) Department of Physics, Sai Gon University, 273 An Duong Vuong, District 5, Ho Chi Minh, Vietnam;

We investigate the influence of phonon confinement on the optically-detected magneto-phonon resonance (ODMPR) effect and ODMPR line-width quantum wells. The ODMPR conditions as functions of the well's width and the photon energy are also obtained. The shifts of ODEPR peaks caused by the confined phonon are discussed. The numerical result for the GaAs/AlAs quantum well shows that in the two cases of confined and bulk phonons, the line-width (LW) decreases with increasing well's width and increases with increasing temperature. Furthermore, in the small range of the well's width, the influence of phonon confinement plays an important role and cannot be neglected in reaching the ODMPR line-width.

Presenter: Tran Cong Phong

P.4 – Poster, NCTP-39

Neutrino mixing and CP violation in 3-3-1 model with S4 flavor symmetry

Vo Van Vien (1), Hoang Ngoc Long (2), and Dinh Phan Khoi (3)

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The 3-3-1 model proposed in 2011 based on discrete symmetry S4 responsible for the neutrino and quark masses is updated, in which the non-zero θ_{13} is focused. The new feature is adding a new $SU(3)_L$ anti-sextet lying in doublet under S4 which can result the non-zero θ_{13} without perturbation. The exact tribimaximal form obtained with the breaking S4 ->S3 in charged

lepton sector while S4 is broken into a group, which is isomorphic to Klein four group (K) in neutrino sector. If both the breakings S4-> K and K -> Z2 are taken place in neutrino sector, the realistic neutrino spectrum is obtained without perturbation. The model predicts the Dirac CP violation phase $\delta = \frac{\pi}{2}$ and $\delta = \frac{3\pi}{2}$ with $\theta_{23} \neq \frac{\pi}{4}$.

Presenter: Viên Văn Võ

P.5 – Poster, NCTP-39

Influence of a Strong Electromagnetic Wave (Laser Radiation) on the Hall Effect in a Cylindrical Quantum Wires with Infinitely High Potential

Nguyen Thu Huong(1), Nguyen Quang Bau(2), Nguyen Duc Luong(2)

(1) Academy of Air Defense and Air Force , Son Tay, Hanoi, Vietnam (2)Faculty of Physics, Hanoi University of Science, Vietnam National University 334-Nguyen Trai, Thanh Xuan, Hanoi, Viet Nam

Based on the quantum kinetic equation for electrons, we theoretically study the influence of a Strong Electromagnetic Wave (EMW) on the Hall effect in a cylindrical quantum wire with infinitely high potential $V(\vec{r}) = 0$ inside the wire and $V(\vec{r}) = \infty$ elsewhere subjected to a crossed dc electric field $\vec{E}_1 = (0, 0, E_1)$ and magnetic field $\vec{B} = (0, B, 0)$ in the presence of a strong EMW (laser radiation) characterized by electric field $\vec{E} = (0, 0, E_0 \sin \Omega t)$ (where E_0 and Ω are amplitude and frequency of EMW, respectively). We obtain the analytic expressions for the components σ_{zz} and σ_{xz} of Hall conductivity as well as Hall coefficient with the dependence on B, Ω, temperature T of system and the radius r (m), the length L(m) characteristic parameters of Cylindrical quantum wire. The results are numerically evaluated and graphed for GaAs/GaAsAl quantum wire to show clearly the dependence of Hall conductivity and Hall coefficient on above parameters.

Presenter: Nguyen Thu Huong

P.6 – Poster, NCTP-39

THE INFLUENCE OF CONFINED ACOUSTIC PHONONS ON THE RA-DIOELECTRIC FIELD IN A QUANTUM WELL

Do Tuan Long(*), Nguyen Quang Bau

Faculty of Physics, Hanoi University of Science, Vietnam National University 334-Nguyen Trai, Thanh Xuan, Hanoi, Vietnam

The influence of confined acoustic phonons on the Radioelectric field in a quantum well has been studied in the presence of a linearly polarized electromagnetic wave and a laser radiation. By using the quantum kinetic equation for electrons with confined electrons – confined acoustic phonons interaction, the analytical expression for the Radioelectric field is obtained. The formula of the Radioelectric field contains the quantum number m characterizing confined phonons and comes back to the case of unconfined phonons when m reaches to zero. The dependence of the Radioelectric field on the frequency of the laser radiation, in case of confined acoustic phonons, is also achieved by numerical method for a specific quantum well AlGaAs/GaAs/AlGaAs. The result shows that the Radioelectric field has a peak and reaches saturation as the frequency of the laser radiation increases.

Presenter: Do Tuan Long

P.7 – Poster, NCTP-39

THE INFLUENCE OF ELECTROMAGNETIC WAVE ON THE MAGNE-TORESISTANCE IN DOPED SUPERLATTICE

NGUYEN QUANG BAU, NGUYEN DINH NAM

Faculty of Physics, Hanoi University of Science, Vietnam National University 334-Nguyen Trai, Thanh Xuan, Hanoi, Viet Nam

By using quantum kinetic equation method the analytic expression of the magnetoresistance in doped superlattice under the influence of Electromagnetic wave is obtained. The magnetoresistance depends on some parameters such as : the intensity of Electromagnetic wave , the magnetic field, the frequency of the Electromagnetic wave, the relaxation time of carier, the temperature and the doped concentration. Estimating numerical values for a GaAs:Si/GaAs:Be doped superlattice, these dependences are nonlinear and the magnetoresistance gets negative value. There are some differences from the case of magnetoresistance in the bulk semiconductor

Presenter: Nguyen Dinh Nam

P.8 – Poster, NCTP-39

Dependence of Hall coefficient on Amplitude of an External Electromafnetic Wave in a Compositional Semiconductor Superlattice

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The Hall coefficient is theoretically calculated in a compositional semiconductor superlattice, subjected to a crossed dc electric field and magnetic field in the presence of an electromagnetic wave (EMW). The magnetic field is oriented along the growth direction of the superlattice. The electron – optical phonon interaction is taken into account at high temperature. Analytical result shows that the Hall coefficient denpends nonlinearly on the EMW amplitude. Numerical results are obtained for GaAs/AlGaAs superlattice and compared to the case of absence of the EMW

Presenter: Hoi Dinh Bui

P.9 – Poster, NCTP-39

EFFECT OF THE ELECTRIC FIELD ON A HYDROGENIC IMPURITY IN A T-SHAPED QUANTUM WIRE

Huynh Ngoc Bay(2), Dang Van Quan(1) and Cao Huy Thien(1)

(1)Ho Chi Minh City Institute of Physics; (2)Binh Thanh Dong High school, Phu Tan , An Giang

The ground state binding energy and electric dipole moment of a hydrogenic impurity in a T-shaped quantum wire subjected to an external electric field have been calculated using the Hartree-like approach. Numerical results have been performed for the case of GaAs T-shaped quantum wire.

Presenter: Dang Van Quan

P.10 – Poster, NCTP-39

AMPLITUDE AND PHASE DYNAMICS OF SPIN-DEGENERATED PO-LARITON CONDENSATE IN SEMICONDUCTOR QUANTUM WIRE

Tran Nu Hanh(2), Dang Van Quan(1) and Cao Huy Thien(1)

(1)Ho Chi Minh City Institute of Physics (2)Phan Boi Chau High School, Son Hoa, Phu Yen

The complex Gross-Pitaevskii equations for amplitude and phase of spin-degenerated polariton condensate in semiconductor quantum wire have been built within spinor polariton model. Time dependence of nonlinear parameters in these equations show difference between them with phenomena Gross-Pitaevskii equations.

Presenter: Dang Van Quan

P.11 – Poster, NCTP-39

Quantum kinetic derivation of the nonequilibrium Gross-Pitaevskii equation for nonresonant excitation of microcavity polaritons

Tri Dung Doan (1), Duy Bao Tran Thoai (1), Hartmut Haug (2)

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The space and time dependent nonequilibrium Keldysh-Green functions are employed to derive the scattering rates between the condensed microcavity polaritons described by a Gross-Pitaevskii equation and an uncondensed higher lying exciton reservoir. Slowly varying center coordinates and rapidly varying relative coordinates are assumed. For particle-particle and particle-phonon interactions the scattering rates which provide gain to the condensate are calculated explicitly. These processes result in scattering rates which are quadratic and linear in the density of reservoir excitons, respectively. The resulting quantum Boltzmann equation for the reservoir is simplified by assuming local thermal equilibrium to rate equations for the exciton density and their temperature. Using the microscopically calculated (not phenomenologically chosen) transition amplitudes for CdTe microcavity polaritons we demonstrate that our model is able to describe the spontaneous pattern formation for a ring-shaped nonresonant excitation as seen in recent experiments

Presenter: Doan Tri Dung

P.12 – Poster, NCTP-39

Heisenberg antiferromagnetic spin S=1/2 chain Ca2CuO3, a covalent or charge transfer insulator?

Nguyen Thuy Trang(1) and Hoang Nam Nhat (2)

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Complex cuprate oxide Ca2CuO3, known as a Heisenberg antiferromagnetic (AFM) spin S=1/2 chain compound, has been strongly studied both theoretically and experimentally owing to its magnetic low dimensionality which causes various quantum effects such as quantum spin fluctuation, spin-charge separation, strongly reduced charge transfer energy pd. In particular, the strongly reduced pd gives rise to the argument of insulating mechanism in the compound which has not been clarified yet. In this paper, on the base of electronic structure calculations using various ab initio methods, we show the correlation between exchange interaction J, band gap Eg, covalence degree of Cu-O bond and insulating mechanism. Such a correlation clears up the question of the disagreement between previous experimental and theoretical investigations on the insulating mechanism of Ca2CuO3. According to this, we strongly suggest the covalent mechanism for the insulating ground state of the 1 dimension (1D) AFM compound. Due to the strong hybridization between O 2p and Cu 3d states, Hubbard U should be added to both O 2p and Cu 3d shells so that the LDA+U method can reproduce exact band gap, Eg 1.5 eV. Besides, the PBE0 functional, which was believed to be able to well-simulate the exchange interaction within copper oxides, can also predict a good band gap value for the cuprate 1D AFM Ca2CuO3.

Presenter: Nguyen Thuy Trang

P.13 – Poster, NCTP-39

Quantum confinement in a parabolic quantum well based on polar materials

Pham Thi Bich Thao (1), Nguyen Duy Khanh (1), Nguyen Thanh Tien (1), Doan Nhat Quang (2)

(1) Department of Physics, College of Natural Science, Can Tho University (2) Institute of Physics, Vietnamese Academy of Science and Technology

Spontaneous and piezoelectric polarization are known to be the key effect on the electronic and optical properties of polar heterostructures. This effect modifies the electronic states in the quantum well. We presented a variational approach to the quantum confinement due to polar charges at the interface of the AlGaN-GaN parabolic single quantum well by varying the Al content in the well region. Electrons diffuse into the well and confine within an asymmetric potential profile. We analyze interaction of the parabolic potential and the polarization effect triangular like potential due to varying the Al content in barrier. We calculate the energy levels and wave functions of the bound states. There are significantly different the energy levels and wave functions of parabolic quantum wells with that of the square quantum well by varying the structural parameters: the alloy content and the well width. This results as the basis for next calculations related to transport and optical properties of the parabolic quantum wells based on polar materials.

Presenter: Pham Thi Bich Thao

P.14 – Poster, NCTP-39

Second quantization model of surface plasmon polariton in metal planar surface

Dao Thi Thuy Nga (1), N.T.P. Lan (2), Do T. Nga (3), and N.A. Viet (3)

(1) Han Thuyen High School; (2) Hanoi Pedagogical University No.2; (3) Institute of Physics, VAST

We study the surface plasmon polariton modes in a metal planar surface. A model effective Hamiltonian with two interaction parameters is proposed in second quantization representation for system of surface plasmons and photon. Using the Bogoliubov transformation technique, the dispersion relations of surface plasmon polariton was calculated. The surface plasmon – photon vertexes also are found. A simple second quantization Hamiltonian of surface polaritons was obtained and could be useful for further investigations more complex systems.

Presenter: Dao Thi Thuy Nga

P.15 – Poster, NCTP-39

Density fluctuations in amorphous and liquid MgO

Nguyen Thu Nhan (1), Dinh Thi Hai Ha (2), Pham Khac Hung (1).

(1) Hanoi University of Science and Technology (2) Hanoi National University of Education

Density fluctuations in liquid and amorphous MgO have been studied using data mining method. We investigated the distribution of atoms, of charge density, and of Mg and/or O atoms on two special subvolumes: 1/ on the coordination sphere in which its radius is determined by the first minimum of the radial distribution function; 2/ on the box which its center is a grid site. The research results indicate that the considered model contains the dense and loose regions. Charge distribution has a peak located at zero in both liquid and amorphous states. The most Mg-rich and O-rich region also examined and obtained the distribution of Mg and O atoms are quite similar.

Presenter: Đinh Thị Hải Hà

P.16 – Poster, NCTP-39

The effective interaction of charged particles with contribution of exchange massless and massive bosons

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The interactions between electrons via exchange massless and massive bosons are considered. In the case of interaction via massless bosons the interaction has an equivalent expression for the Coulomb and Yukawa potentials. In the case of the interaction via massive particles the interaction contains a term providing the potential well. Taking into account the repulsive Coulomb interaction between electrons, the effective interaction presents a minimum at some finite. The obtained results are able to understand and to explain of some physical and biological systems.

Presenter: Nguyễn Trí Lân

P.17 – Poster, NCTP-39

Cyclotron-Phonon Resonance in Monolayer Graphene

Nguyen Thi My Phuong (1), Pham Tung Lam (1), Nguyen Van Quang (1), Huynh Vinh Phuc (2)

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In this report, the cyclotron-phonon resonance (CPR) in monolayer graphene via two-photon absorption process is investigated when electrons are scattered by zone-center and zone-edge optical phonons. Using perturbation methods, we obtain the expression of the diagonal conductivity.. Resonances are separated into three types: principal, symmetric, and asymmetric transitions in which the principal transition gives dominant contribution to the CPR diagonal conductivity. The inter-band scattering gives higher contribution to the total CPR conductivity in comparison with the intra-band scattering.

Presenter: Huỳnh Vĩnh Phúc

P.18 – Poster, NCTP-39

Surface Oxide Formation on Pt Cathode of Proton Exchange Membrane Fuel Cells: Effects of Reaction Intermediates

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One of great challenges of using Pt in designing proton exchange membrane fuel cells (PEMFCs) for automotive applications is the degradation of Pt cathode electrocatalysts due to Pt dissolution under operating conditions over the time. Pt surface oxides are believed to be a crucial cause for the Pt dissolution in the oxygen reduction reaction (ORR) environment. Although gaseous O_2 is always present during the ORR, ex situ techniques in studies of the Pt surface oxide formation have been conducted in the absence of O_2 owing to experimental limitations. In the absence of O_2, the surface oxides form at high potentials of more than 1.1 V at which surface reconstructions often occur simultaneously. In fact the PEMFC cathode operates over a potential range of 0.7 – 1.0 V for majority of the time during highway cruising conditions where the ORR are taking place. In situ techniques were conducted to resolve the ex situ experimental limitations. It was found that the Pt oxide formation initiated at potentials as low as 0.75 V under O_2-sparging, and gaseous O_2 significantly enhances the Pt dissolution during potential cycling. Many researches suggested that atomic oxygen in the subsurface, which resulted from oxygen diffusion from on-surface to subsurface of adsorbed oxygen atoms, should play as an initial driving force for the Pt dissolution in the ORR environment at low potentials. Furthermore, our computational studies have suggested that the ORR is a multistep reaction with many possible reaction intermediates such as OH, OOH, and HOOH. Using density functional theory calculations, Balbuena et al. has studied the diffusion of adsorbed oxygen to Pt subsurface in

the presence of another atomic oxygen atom on Pt surface. In the presence of gaseous O2, it is, however, possible to find adsorbed O2 rather than only atomic oxygen on Pt surface. Regarding to adsorption strength, O2 is much weaker than atomic oxygen that may cause different effects on the oxygen diffusion. It means that the diffusion can happen in the presence of adsorbed O or/and adsorbed O2. The overall aforementioned context has led to a question that how adsorbed O2 and other reaction intermediates affect the Pt surface oxide formation. By answering this question, we can intimately elucidate the experimental data that at which reaction step the enhanced-dissolution effect is really performed by gaseous O2, and hence, can introduce the way to solve the deterioration of Pt catalyst.

Presenter: Do Son

P.19 – Poster, NCTP-39

Retrieval of interatomic separation from high-order harmonic spectra using the electron interference effect

Le Cam Tu, Hoang Van Hung, Nguyen Ngoc Ty, Le Van Hoang

HCMC University of Pedagogy

We study the interference effect in high-order harmonic spectra of H2+ and propose a new method to extract interatomic separation using this effect. First, the dipole moment could be extracted from HHG spectra by the tomography procedure. Second, using the Bragg formula for the zero-points of the dipole moment in molecular frame we obtain the interatomic separation. The special point of this retrieval method is that we can use not only the parallel component of HHG but also the perpendicular components. We have found the error-cancellation effect which means the errors of interatomic separation from the two components of HHG are opposite on the sign. Therefore, the final result of interatomic separation has a very high accuracy.

Presenter: Le Thi Cam Tu

P.20 – Poster, NCTP-39

Investigation of thermodynamic properties of metal thin film by statistical moment method

VU VAN HUNG1, DUONG DAI PHUONG2 , NGUYEN THI HOA3 and LE THI THANH HUONG4

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The thermodynamic properties of the metal thin films with body-centered cubic structure at zero pressure are investigated using the statistical moment method (SMM), including the anharmonicity effects of thermal lattice vibrations. The Helmholtz free energy, linear thermal expansion coefficients, specific heats at the constant volume and those at the constant pressure, and are derived in closed analytic forms in terms of the power moments of the atomic displace-

ments. Numerical calculations for thermodynamic quantities of W, Nb, Fe and Ta thin films are found to be in good agreement with those of the other theoretical results and experimental data. Keywords: Statistical moment method, thermodynamic properties, anharmonic, thin films.

Presenter: Duong Dai Phuong

P.21 – Poster, NCTP-39

ẢNH HƯỞNG CỦA DAO ĐỘNG HẠT NHÂN LÊN PHỔ PHÁT XẠ SÓNG ĐIỀU HOÀ BẬC CAO CỦA PHÂN TỬ H2+

PHAN THỊ NGỌC LOAN, NGUYỄN NGỌC TY

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Bằng phương pháp giải số phương trình Schrödinger phụ thuộc thời gian, phổ sóng điều hoà bậc cao từ phân tử H2+ dao động được tính toán khi tương tác với chùm laser cường độ cao xung cực ngắn. Kết quả cho thấy với các bậc dao động đầu, phân tử có hạt nhân dao động mạnh hơn sẽ phát ra sóng điều hoà bậc cao có cường độ cao hơn. Tuy nhiên, với các mức dao động cao, cường độ sóng điều hoà bậc cao không phụ thuộc nhiều vào bậc dao động, xuất hiện dấu hiệu bão hoà. Hơn nữa, khi cường độ hoặc chu kì của laser tương tác tăng, hiện tượng bão hòa bắt đầu xảy ra ở bậc dao động thấp hơn.

Presenter: Phan Thị Ngọc Loan

P.22 – Poster, NCTP-39

ẢNH HƯỞNG CỦA DAO ĐỘNG HẠT NHÂN LÊN QUÁ TRÌNH ION HOÁ PHÂN TỬ H2+

TRƯƠNG THỊ TRÂN CHÂU (1) , PHAN THỊ NGỌC LOAN (2), NGUYỄN NGỌC TY (2)

(1) Khoa Khoa học cơ bản, Đại học Sư phạm kỹ thuật TP HCM, số 1 Võ Văn Ngân, quận Thủ Đức, TP HCM (2) Khoa Vật lý, Đại học Sư phạm TP HCM, 280 An Dương Vương, quận 5, TP HCM

Bằng phương pháp giải số phương trình Schrödinger phụ thuộc thời gian, xác suất ion hoá được tính toán khi xét đến dao động hạt nhân của phân tử H2+ khi tương tác với chùm laser cường độ cao xung cực ngắn. Chúng tôi nhận thấy rằng xác suất ion hóa sẽ tăng theo thời gian và sẽ đạt đến giá trị bão hòa. Kết quả cho thấy với các bậc dao động đầu, xác suất ion hóa từ một mức dao động cao sẽ lớn hơn từ mức thấp. Tuy nhiên với các mức dao động cao hơn thì đến một bậc nhất định xác suất ion hóa sẽ cực đại và giảm dần.

Presenter: Truong Thi Tran Chau

P.23 – Poster, NCTP-39

Exact numerical wave functions for a molecular model with two charged nuclei and ab initio calculations of ionization of polar molecules

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We use the FK operator method to solve the Schrodinger equation for the (Z1, Z2) molecular model which has one electron moving in the Coulomb field of two differently charged nuclei. The obtained wave-functions with very high accuracy are used for calculation of ionization rate of the model. These calculations are useful for analyzing the dependence of ionization rate on alignment of polar molecules which is of great interest recently. Therefore in this work we improve the method to have solutions of the Schrödinger equation with any given precision. This model can be also applied to the positively charged exciton.

Presenter: Hoàng Đỗ Ngọc Trầm

P.24 – Poster, NCTP-39

THE GENERAL SOLUTION OF BACKWARD DIFFUSION EQUATION

Vu Ba Dung (1), Dao Thi Trang (2) and Dinh Van Thien (1)

(1) Hanoi University of Mining and Geology (2) Hanoi National University of Education

The diffusion is elementary and universal process in natural. The rate law of diffusion had been formulated by A. Fick in which the diffusion flux is proportional to the gradient of the concentration and diffusion flux goes from regions of higher concentration to regions of lower concentration. If the thermal velocity of molecules in lower concentration area is greater than velocity of molecules in higher concentration area, there are two molecule fluxes, one of them is the advection flux and the other is backward diffusion flux. Both the advection flux and the backward diffusion flux are going from regions of lower concentration to regions of higher concentration (backward diffusion process). In this paper the backward diffusion process is contrary to the fundamental laws of diffusion as Fick's law and Onsager's laws, but which are explained. Moreover, the equation of backward diffusion and the solution of which are also presented and discussed.

Presenter: Vu Ba Dung

P.25 – Poster, NCTP-39

Analysis the UV-Spectra of Neurglobin Based on Two-Optical Model

T. T. Thao, C. T. Anh, N. T. Lan and N. A. Viet

Institute of Physics

Neuroglobin (Ngb), a novel member of the Hemoglobin Group, is recently discovered by Burmester et al. Having its uncertain physiological function make a lots of interest, recently. The existing of a six-coordination heme geometry with proximal and distal histidines directly create the axis within the heme iron, while the sixth ligand coordination bound to small ligand reversibly. The analysis of UV-visible spectra of Ngb the well-know two-level model, we make some

Presenter: To Thi Thao

P.26 – Poster, NCTP-39

A model of optical trapping cold atoms by using surface plasmon effect with singularities generated by evanescence Bessel beams

Nguyen Thi Phuong Lan (1), D.T. Thuy Nga (2), Do T. Nga (3) and N.A. Viet (3)

(1) Hanoi Pedagogical University No.2; (2) Han Thuyen High School; (3) Institute of Physics

When a laser Bessel beam light is totally reflected at the planar surface of a dielectric on which a thin film has been deposited, a surface plasmons with phase singularities can be produced. This two-dimensional plasmons lead to an attractive potential with enhancement. Using this effect, we construct a model for optical trapping cold atoms. Efficiency of the trap will be presented by a circle of radius r in the (x, y) directions and the distance d from planar surface in the z-direction.

Presenter: Nguyen Thi Phuong Lan

P.27 – Poster, NCTP-39

Moon tide and the origin of life

Nguyen Thi Thu Nguyet (1), T.T.T. Van (2), N.V. Thanh (2), and N.A. Viet (2)

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A system containing three or more objects (such as the solar system) always has chaotic behavior and uncertainty, which play an important role in its evolution history. Possible influence of the Moon and its ocean tide effect on the creation and evolution of life on Earth is investigated in the in-determistic approach. Assuming that at time of the origin of life, the Moon was much closer to the Earth, so the tides raised by Moon was much large than nowadays. Big amplitude of tides allows more efficiency for creation and evolution of life via stronger wetting/drying cycles and mixing the pre-biotic soup in primordial sea. A model of tidal pools in frame work of restricted problem is investigated. A possible role of effective bio-time and entropy/information temperature dependence were discussed.

Presenter: Nguyễn Thị Thu Nguyệt

P.28 – Poster, NCTP-39

Tide-money hypothesis and crisis of stock exchange market

Nguyen Thi Thu Nguyet (1), C. Thuy Anh (2), T.T.T. Van (2), N. Tri Lan (2), and N.A. Viet (2)

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Human body like an electric dipole antenna affected by conditions of surrounding environment. There is a hypothesis that moon tide has a connection with crisis of stock exchange market. It was claimed this situation can be seen in the 1998 world stock exchange market crisis. Based on the tide data of Hon-dau in Halong bay, where Newton has took information for establishing the gravitation law in his famous book "Principe", we checked this hypothesis with 2008 world financial crisis and found that no clear connection between the two evens.

Presenter: Nguyễn Thị Thu Nguyệt

P.29 – Poster, NCTP-39

A simple interface shell model for core parts of soft spherical particles and virus

Bui Thi Le Quyen (1), D. Ngoc Mai (2), N. Lam Hoai (2), and N.A. Viet (2)

(1) Thai binh University of Medical and Pharmacy (2)Institute of Physics, 10 Dao-tan, Ba-dinh, Hanoi

When a charged DNA or polymer are folded and form a spherical core, because the strong overlapping effect at very high concentration, quasi-free behavior of electron is considered. For this case, the effective potential is calculated and shown that electrons prefer to move to border and form a negative charged spherical shell. The negative sphere attracts the positive ions in the surrounding solution and form a condensate-like interface shell. This leads to enhance screening effect in our previous core model for virus and soft particles.

Presenter: Bùi Thị Lệ Quyên

P.30 – Poster, NCTP-39

Effective mass of photon in liquid water environment of life and soft maters

Bui Thi Le Quyen (1), D. Ngoc Mai (2), N. Tri Lan (2), and N.A. Viet (2)

(1) Thai Binh University of Medical and Pharmacy (2) Institute of Physics, 10 Dao-tan, Ba-dinh, Hanoi

It is well known that from four fundamental forces, only electro-magnetic force plays clear and important role in our life reality. The spin one exchange boson caring the electro-magnetic interaction is photon. The condition of zero-mass of photon leads to the Coulomb law with long-range interaction behavior. We consider analogy Anderson-Higgs mechanism, in some liquid water environments under a certain temperature and pH conditions, photon can have a finite effective mass, consequence to a Yukawa type potential. This screening potential could leads to sort-range behavior of electro-magnetic effective interaction. We use this mechanism to develop physics models to explain some phenomena in life and soft systems.

Presenter: Bùi Thị Lệ Quyên

P.31 – Poster, NCTP-39

Q-deformed harmonic oscillator and Morse-like aharmonic potential

Ngo Gia Vinh (1), M.V. Ngu (2), N. Tri Lan (3), L.T.Kim Thanh (4), and N.A. Viet (3)

(1) Bac Ninh Department of Education and Traning, Bac Ninh; (2) Hung Yen Industrial Colleage; (3) Institute of Physics; (4) Hanoi Pedagogical University No.2

Connection between q-deformed harmonic oscillator and Morse-like aharmonic potential is investigated. It is well known that the potential of harmonic oscillator is parabolic. We have shown that the potential of q-deformed harmonic oscillator could be a Morse-like aharmonic potential. The relation between the deformation parameter q and the set of parameters of Morse-like aharmonic potential was found. We investigated also the partition function and some thermodynamic properties of q-deformed harmonic oscillator.

Presenter: Ngo Gia Vinh

P.32 – Poster, NCTP-39

First, second quantizations and q-deformed harmonic oscillator

Man Van Ngu (1) , N.G. Vinh (2), Nguyen. T. Lan (3), L.T.K. Thanh (4), and N.A. Viet(3)

(1) Hung Yen Industrial Colleage; (2) Bac Ninh Department of Education and Training; (3) Institute of Physics, 10 Dao Tan, Ba-Dinh, Hanoi; (4) Hanoi Pedagogical University No. 2

Relations between first, second quantization representations and deform algebra are investigated. In the case of harmonic oscillator, the axiom of first quantization (the commutation relation between coordinate and momentum operators) and the axiom of second quantization (the commutation relation between creation and annihilation operators) are equivalent. We shown that in the case of q-deformed harmonic oscillator, a violence of the axiom of second quantization leads to a violence of the axiom of first quantization, and inverse. Using the coordinate representation, we study fine structures of the vacuum state wave function depend in the deformation parameter q. A comparison with fine structures of Cooper pair of superconductivity in the coordinate representation also is performed.

Presenter: Man Van Ngu

P.33 – Poster, NCTP-39

General auto catalytic theory and simple model of financial markets

Chu Thuy Anh, Nguyen Tri Lan and Nguyen Ai Viet

Institute of physics

The concept of auto catalytic theory has become a powerful tool in understanding evolutionary processes in complex systems. A generation of auto catalytic theory was assumed by consideration that the initial element now has some distribution instead of a constant value as in traditional theory. This initial condition leads to that the final element might have some distribution too. A simple physics model for financial markets is proposed, using this general auto catalytic theory. Some general behaviors of evolution process and risk moment of a financial market also are investigated in frame work of this simple model.

Presenter: Chu Thuy Anh

P.34 – Poster, NCTP-39

Simple grading model for financial markets

Chu Thuy Anh, Nguyen Tri Lan, Nguyen Ai Viet

Institute of Physics

A simple way to estimate and grade a financial market by comparison the evolution process and the shape of distribution functions was proposed. In normal working state of financial market, the shape of distribution functions have one-peak form and change from Boltzmann-like to Gaussian-like distributions, while in risk moment might have two-peak form. The grad of financial markets was characterized by overlap area of initial and final distribution functions, and for risk degree by the separation between two shoulders of distribution function. The meaning of Levi tails of distribution and laws of general entropy and information was discussed.

Presenter: Chu Thuy Anh

P.35 – Poster, NCTP-39

Temperature dependent magnetization of the two band model for diluted magnetic semiconductors

Vu Kim Thai (1), Hoang Anh Tuan (2)

(1) Hanoi University of Economic and Technical Industries (2) Institute of Physics, VAST

The temperature dependent magnetization of a two band model for diluted magnetic semiconductors as a function of magnetic coupling constant, hopping parameters and carrier densities is calculated by using the coherent potential approximation. It is shown that the degree of overlapping of the impurity bands and carrier density are crucial parameters determining the magnetization behavior of the system.

Presenter: Hoang Anh - Tuan

P.36 – Poster, NCTP-39

Effects of Macromolecular Crowding on Protein Folding

Bui Phuong Thuy (1,2), Hoang Thi Thu Huong (1), Trinh Xuan Hoang (1)

(1) Institute of Physics, Vietnam Academy of Science and Technology; (2) NamDinh University of Technology Education

Apart from the aid of molecular chaperones, folding of most proteins in vivo is known to be strongly influenced by the presence of a large number of macromolecules at a very high concentration in the cytoplasm. In this study we investigate the equilibrium and kinetic effects of macromolecular crowding on folding of proteins by using molecular dynamics simulation method with Langevin equation. A coarse-grained Go-like model is adopted for protein while the crowders are modeled as hard spheres that interact with the protein via repulsive potentials. Our results show that the crowders enhances stability of protein. Folding is faster but less cooperative as the volume fraction of crowders increases. The effect of crowder's size on folding is discussed in comparison to experiments and other theoretical results.

Presenter: Bui Phuong Thuy

P.37 – Poster, NCTP-39

Aggregation of peptides in the tube model with correlated sidechain orientations

Nguyen Ba Hung (1,2), Trinh Xuan Hoang (1)

(1) Insitude of Physics, VAST (2) Vietnam Military Medical University

The ability of proteins and peptides to aggregate and form toxic amyloid fibrils has been associated with a range of diseases including BSE (or madcow), Alzheimer's and Parkinson's Diseases. In this study, we investigate the the role of amino acid sequence in the aggregation propensity by using a modified tube model with a new procedure for hydrophobic interaction. In this model, the amino acid sidechains are not considered explicitly, but their orientations are taken into account in the formation of hydrophobic contact. Extensive Monte Carlo simulations for systems of short peptides are carried out with the use of parallel tempering technique. Our results show that the formation of amyloid-like beta-structures by small number of peptides strongly

depends on the amino acid sequence. Correlation of sidechain orientations promotes elongation of protofibrils. Our study provides an insight into the principles of how the formation of amyloid can be adjusted by amino acid sequence.

Presenter: Nguyễn Bá Hưng

P.38 – Poster, NCTP-39

Edge states in a correlated Chern insulator

Hong-Son Nguyen [1] *and Minh-Tien Tran* [2]

[1]*Department of Occupational Safety and Health, Trade Union University, 169 Tay Son, Hanoi, Vietnam*
[2]*Institute of Physics, Vietnam Academy of Science and Technology, 10 Dao Tan, Hanoi, Vietnam*

Edge states in a correlated Chern insulator is investigated within an inhomogeneous dynamical mean-field theory. The correlated Chern insulator is described by the Haldane model and the electron correlations are incorporated by introducing the short-range interaction between the itinerant electrons and localized fermions. It is found that the edge states are affected by electron correlations. In weak electron correlation region, the Dirac electron states are established at the boundary of the insulator that the phase is typically a Chern insulator, while in strong correlation region, the edge states are not observed.

Presenter: Nguyễn Hồng Sơn

P.39 – Poster, NCTP-39

Size dependent melting of Silicon nanoparticles

Nguyen Thi Thuy Hang

HCMC University of Technology

Melting of crystalline silicon nanoparticles is studied by molecular dynamics (MD) simulations using Stillinger-Weber potential. Size dependent melting is presented. Models are heated up from a crystalline to a normal liquid state. Temperature dependence of total energy and the Lindemann ratio exhibit a first-order-like behavior of the transition at a melting point. Heat capacity of the system presents a single peak at around the melting point. As the size of the nanoparticles increases, the variation of the melting point becomes more monotonic and the temperature range of bistability shifts to higher temperatures. In large nanoparticles, the proportion of interior atoms increases and the average potential energy per atom converges to the bulk or thinfilm.

Presenter: Nguyễn Thị Thúy Hằng

Workshop Abstracts

I.1 – Invited, IWTCP-2

Masses, mixings and Majorana from 6D

Jean-Marie Frère

Université de Libre de Bruxelles, Bruxelles, Belgium

We review a model proposed some time ago, and extended to neutrinos. It provides a possible understanding of mass hierarchies,links large mixing angles in the leptonic sector to Majorana character, and was able to predict a sizeable mixing θ_{13} between neutrinos.

Presenter: Jean-Marie Frère

I.2 – Invited, IWTCP-2

Status and prospects of the Belle II experiment

Tomoyuki Konno

Belle-2 collaboration, and Tokyo Metropolitan University, Tokyo

The Belle II experiment is a high-precision flavor physics measurement with the SuperKEKB asymmetric e+e- collider in Japan.The experiment is an upgrade of the Belle experiment at the KEKB collider and designed to search for new physics beyond the Standard Model from a wide range of flavor physics channels by collecting physic event samples of B mesons, charm with 40 times higher luminosity of the Belle experiment. In this presentation, we will show construction status of the Belle II detector and physics prospects of the experiment.

Presenter: Tomoyuki Konno

I.3 – Invited, IWTCP-2

Neutron Electric Dipole Moment Search at the Paul Scherrer Institute

Gilles Ban

nEDM collaboration and Université de Caen Basse Normandie, Caen, France

Search for Electric Dipole Moments (EDM) is a very powerful tool to probe physics beyond the Standard Model. In any Standard Model extension EDM can be calculated, these values can be compared to the experimental limits and therefore SM extensions can be validated. For the neutron electric dipole moment (nEDM) the current best limit has been set by the

Sussex-Rutherford-ILL [1] at |dn| < 2.9 x 10-26 ecm (90% CL). This experimental limit is far away from the SM value, still extension of the SM give nEDM values which are in the range of new nEDM experiments. The nEDM is measured via the Larmor frequency shift of ultra cold neutrons (UCN) in parallel and anti- parallel magnetic and electric fields. At the new UCN source at the Paul Scherrer Institute (2011,Switzerland), we have installed an improved RAL Sussex spectrometer and the collaboration aims to put a new limit on the nEDM: in the range of 10- 26e.cm at 95% CL. In a second step, we aim to improve by another order of magnitude the experimental limit in a new room temperature spectrometer setup at PSI. We will present the experiment status, improvements and discus the ongoing R&D effort on a new spectrometer schedule to run in 2017.

[1] C.A. Baker et al. PRL, 97:131801, 2006.

Presenter: Gilles Ban

I.4 – Invited, IWTCP-2

Status of KAGRA and gravitational wave astronomy

Yousuke Itoh

KAGRA collaboration and University of Tokyo

KAGRA is the Japanese gravitational wave telescope now under construction and will begin its operation at design sensitivity in the coming decade. It is the first gravitational wave telescope in the world that operates at cryogenic temperature and underground. With such distinctive features KAGRA would join in the world-wide collaborative and competitive efforts for detecting gravitational waves and establishing gravitational wave astronomy to explore yet undiscovered aspects of the universe. In this talk, starting from the basics of what gravitational wave is, I will introduce what we expect from the gravitational wav astronomy and then review the status of KAGRA.

Presenter: Yousuke Itoh

I.5 – Invited, IWTCP-2

Physics at the ILC and progress towards its realization

Tomohiko Tanabe

University of Tokyo, Tokyo, Japan

The International Linear Collider (ILC) is a next-generation energy-frontier machine in electron-positron collisions. The talk will mainly focus on the physics case for the ILC, highlighting the precision studies of the Higgs boson and the top quark, and their implications on new physics searches, as well as selected topics on direct searches for new particles. In addition, the ongoing efforts toward the realization of the ILC will be summarized, with a focus on the activities in Japan, where the scientists have selected and proposed a candidate site for the ILC.

Presenter: Tomohiko Tanabe

I.6 – Invited, IWTCP-2

Recent achievements in the study of thermal pairing and giant resonances in highly excited nuclei

Nguyen Dinh Dang

1) Theoretical Nuclear Physics Laboratory, Nishina Center for Accelerator-Based Science, RIKEN, 2-1 Hirosawa, Wako city, 351-0198 Saitama, Japan; 2) Institute for Nuclear Science and Technique, Hanoi, Vietnam

Recent experimental and theoretical results are presented, which show the effect of thermal pairing in highly excited nuclei. It is demonstrated that thermal pairing included in the phonon damping model (PDM) [1] is responsible for the nearly constant width of the giant dipole resonance (GDR) at low temperature T < 1 MeV [2]. It is also shown that the enhancement observed in the recent experimentally extracted nuclear level densities in 104Pd at low excitation energy and various angular momenta is the first experimental evidence of the pairing reentrance in a finite (hot rotating) nucleus [3].

In the study of GDR in highly excited nuclei, the phonon damping model (PDM) has been extended to include finite angular momenta. The results of calculations within the PDM are found in excellent agreement with the latest experimental data of GDR in the compound nucleus 88Mo [4].

Finally, an exact expression has been derived to calculate the shear viscosity η as a function of T in finite nuclei directly from the GDR width and energy at zero and finite T. Based on this result, the values η/s of specific shear viscosity in several medium and heavy nuclei were calculated and found to decrease with increasing T to reach $(1.3-4) \times \hbar/(4\pi k_B)$ (k_B is the Boltzmann constant) at T = 5 MeV, that is almost the same value obtained for quark-gluon-plasma at T > 170 MeV [5].

References:

[1] N. Dinh Dang and A. Arima, Phys. Rev. Lett. 80 (1998) 4145, Nucl. Phys. A 636 (1998) 427.

[2] N. Dinh Dang and N. Quang Hung, Phys. Rev. C 86 (2012) 044333; B. Dey et al., Phys. Lett. B 731 (2014) 92.

[3] N. Dinh Dang, N. Quang Hung, B.K. Agrawal, V.M. Datar, A. Mitra, and D.R. Chakrabarty, in preparation.

[4] N. Dinh Dang, M. Ciemala, M. Kmiecik, and A. Maj, Phys. Rev. C 87 (2013) 054313.

[5] N. Dinh Dang, Phys. Rev. C 84 (2011) 034309.

Presenter: Nguyen Dinh Dang

I.7 – Invited, IWTCP-2

Cosmic inflation and its predictions

Misao Sasaki

Yukawa Institute for Theoretical Physics, Kyoto University, Kyoto, Japan

The idea that there was a period of accelerated expansion in the very early universe, inflation, has been extremely successful. It has become part of the standard theory of cosmology today. In this talk, I review recent developments in the theory of cosmic inflation and its predictions.

Presenter: Misao Sasaki

I.8 – Invited, IWTCP-2

The BICEP2 Experiment and Result

Hien T. Nguyen

Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, USA

I will briefly review the development of theoretical ideas, and the experimental technique for the detection of primordial gravitational waves. And I will follow with an account on how Bicep2 instrument came about, and discuss its recent result.

Presenter: Nguyen Trong Hien

I.9 – Invited, IWTCP-2

Echoes from the past

Jinn-Ouk Gong

Asia Pacific Center for Theoretical Physics (APCTP), Pohang, Republic of Korea

Primordial inflation is regarded as the leading paradigm for the very early universe. After quickly reviewing some basic elements, I discuss the current status of inflationary theories especially in the light of effective theory approach and primordial gravitational waves. I also comment on future probes for the early universe.

Presenter: Jinn-Ouk Gong

I.10 – Invited, IWTCP-2

Electroweak-scale seesaw mechanism and its experimental implications for the LHC and ILC

Pham Quang Hung

University of Virginia, Charlottesville, Virginia, USA

A model in which the right-handed neutrinos acquire a Majorana mass naturally of the order of the electroweak scale is presented with a special emphasis on the Higgs sector in light of the discovery of the 126-GeV SM-like Higgs boson. Implications for the LHC and the ILC will be discussed.

Presenter: Pham Quang Hung

I.11 – Invited, IWTCP-2

Handling accuracy in Bayesian automatic adaptive quadrature

Gheorghe Adam

Joint Institute for Nuclear Research, Dubna, Russian Federation

The standard automatic adaptive quadrature of a Riemann integral [1, 2] was documented to fail (see e.g., [3, 4]) under circumstances like, for instance, the occurrence of inner abscissas of the integration domain at which the integrand or its first order derivative are either singular, or present finite discontinuities, or else slow convergence under subrange subdivision entails spu-

rious activation of a procedure for convergence acceleration.The Bayesian automatic adaptive quadrature (Baaq) was proposed by us ([5, 6] and references therein) as a means to get either reliable outputs in difficult cases, or to identify the classes of integrals the solution of which cannot be obtained by the use of quadrature sums under floating point computations. A central issue enabling the success of the Baaq approach is the accuracy handling of the floating point computations involving differences of computed integrand values. In the present report we address a number of critical issues enabling the increase of the resolving power of the quadrature sums and strengthening the reliability of the inferences following from the Bayesian analysis:

(i) implementation of local quadrature rules using redundancy;

(ii) fast algorithm implementation of the Clenshaw-Curtis quadrature sums by using binary tree structures relating subsets of quadrature coefficients;

(iii) refinement of the classification of the monotonicity intervals resolved within the generated integrand profile;

(iv) resolving the endpoints of the distinct monotonicity intervals to machine accuracy;

(v) adaptive subrange subdivision at discretization abscissas defined by the endpoints of the resolved subranges during the Bayesian analysis.

Presenter: Gheorghe Adam

I.12 – Invited, IWTCP-2

Computer applications in nuclear and particle physics experiments

Masaharu Nomachi

University of Osaka, Osaka, Japan

Particle and nuclear physics experiments has intensively used computers. A brief history of the evolution on trigger and data acquisition will be presented, followed by some conceptual architectures for the future experiments. Those systems are designed to efficiently extract interesting physics from huge amount of background in frontier of experimental physics. Modern state-of-the-art read-out architectures and technologies will be reviewed. Nowadays, they are applied to other fields from security scanners, severe nuclear accident monitoring instrumentation to medical imaging systems like Positron Emission Tomography and particle therapy.

Presenter: Masaharu Nomachi

I.13 – Invited, IWTCP-2

Automatic Calculation Systems for High Energy Physics

Yoshimasa Kurihara

KEK, Tsukuba, Japan

Recent high energy experiments achieved high precision measurements of parameters in the standard theory of the elementary particle physics. According to these precision measurements, theoretical predictions are also required to be more precise. To meat these requirements, we have to calculate total and differential cross sections for many final particles at a tree level or higher order corrections. In order to perform those precise and large scale calculations, automatic systems to evaluate Feynman amplitude are developed. In this talk, we will give an overview of

developments for automatic systems in the world. Especially we will explain recent achievements of one of the those system, GRACE system.

Presenter: Yoshimasa Kurihara

I.14 – Invited, IWTCP-2

Dark matter and the Higgs

Genevieve Belanger

Laboratoire d'Annecy-le-Vieux de Physique Théorique (LAPTH), Annecy, France

The Higgs discovery at the LHC and the measurements of the Higgs couplings have strong implications for physics beyond the standard model and in particular for dark matter models. This will be illustrated in models with an extended scalar sector, in particular with one additional doublet and one singlet. I will show how this class of models are constrained by the LHC results. An overview of dark matter properties in extended scalar models will also be given.

Presenter: Genevieve Belanger

I.15 – Invited, IWTCP-2

Dark U(1)

Tzu Chiang Yuan

Institute of Physics, Academia Sinica, Taiwan

We present results of our recent studies of some collider as well as astrophysical implication of a hidden global or local U(1) sector that might exist beyond the standard model gauge group.

Presenter: Tzu Chiang Yuan

I.16 – Invited, IWTCP-2

Nuclear- Particle- and Astro-physics: Which choice for Viet Nam?

Pierre Darriulat

Institute for Nuclear Science and Technology, 179 Hoang Quoc Viet, Nghia Do, Cau Giay, Hanoi, Vietnam

Arguments of relevance to the definition of a science policy allowing for improved performance in fundamental sciences are briefly reviewed. Emphasis is on experimental and observational physics in the domains of nuclear-, particle- and astro-physics. The aim is not to claim any particular wisdom but simply to trigger discussion.

Presenter: Pierre Darriulat

O.1 – Oral, IWTCP-2

Radiative transfer modeling and its applications in probing the physical conditions of stellar environments

Dinh Van Trung

Institute of Physics, Vietnam Academy of Science and Technology

Our understanding of the stellar environment mainly comes from interpretation of imaging and spectroscopic observations of these objects. To infer the physical conditions it is necessary to model in detail the excitation processes involved in the formation of atomic or molecular spectral lines together with the influences of the dynamics of the environment such as large scale linear motion or rotation. In this contribution I will focus on the molecular excitation processes and the techniques and sophisticated tools used to simulate the formation and transfer of spectral lines in stellar environment. The development of these radiative transfer techniques and tools by our group is also highlighted. Comparison between simulations and observational data allows to extract the information on the physical conditions of the environment. I will also present our study of several typical stellar and circumstellar objects ranging from the envelopes around intermediate mass stars such as CW Leo to supergiant stars such as VY CMa to illustrate the important interplay between observations and theoretical modeling in understating these objects.

Presenter: Dinh Van Trung

O.2 – Oral, IWTCP-2

Radiative emission of neutrino pairs in atom and light sterile neutrinos

D. N. Dinh

Institute of Physics, Hanoi

Universal observation and short long base (SLB) experiments of neutrino oscillations give hint for the presence in mixing of one or more additional neutrino states with masses at eV scale. If their mixing with the active neutrinos as large as recent constraint from SLB experimental data, then they might be sensitive to Radiative Emission of Neutrino Pair (RENP) experiment. In the report, we discuss the possibility to test the hypothesis of existence of these new neutrino states using RENP.

Presenter: Dinh Nguyen Dinh

O.3 – Oral, IWTCP-2

Pairing reentrance phenomenon in hot rotating nuclei

Nguyen Quang Hung

School of Engineering, Tan Tao University, Tan Tao University Avenue, Tan Duc E.City, Duc Hoa, Long An Province, Vietnam

Pairing reentrance phenomenon of highly rotating excited (hot) nuclei is studied within the Bardeen-Cooper-Schrieffer (BCS)-based approach, taking into account the effect of thermal fluctuations on the pairing field at finite temperature and angular momentum within the pairing model plus noncollective rotating along the symmetry axis. The results obtained for the pairing gaps, total energies, heat capacities, and level densities show that the thermal fluctuations smooth out the superfluid-normal phase transition and leads to the appearance of a thermally assisted pairing or pairing reentrance in hot rotating nuclei, which can be clearly seen in the behavior of pairing gaps obtained at finite temperature and angular momentum [1]. Moreover,

in addition to the pairing gap, the anomalous enhancement of level density also serves as a good indicator of the appearance of the pairing reentrance [2]. This feature has been recently confirmed by an experimental analysis of the reaction $12^C+93^Nb -> 105^Ag* -> {}^{1}04^Pd*$ +d at the incident energy of 40 – 45 MeV in which an observation of the enhancement of nuclear level density at finite excitation energy and total angular momentum has been reported.

References: N. Quang Hung and N. Dinh Dang, Phys. Rev. C 78, 064315 (2008). N. Quang Hung and N. Dinh Dang, Phys. Rev. C 84, 054324 (2011).

Presenter: Nguyen Quang Hung

O.4 – Oral, IWTCP-2

Higgs boson mass, neutrino masses and mixing and 7 keV sterile neutrino dark matter in a $U(1)_R$ lepton number model

Sabyasachi Chakraborty, Sourov Roy.

Indian Association for the Cultivation of Science, India.

We discuss neutrino masses and mixing in the framework of a supersymmetric model with a $U(1)_R$ symmetry, consisting of a single right handed neutrino superfield with an appropriate R charge. The lepton number (L) of the standard model fermions are identified with the negative of their R-charges. As a result, a subset of leptonic R-parity violating operators can be present and are consistent with the $U(1)_R$ symmetry. This model can produce one light Dirac neutrino mass at the tree level without the need of introducing a very small neutrino Yukawa coupling. We analyze the scalar sector of this model in detail, where one of the sneutrinos might acquire a substantial vacuum expectation value and plays the role of a down type Higgs field. A new tree level correction to the Higgs boson mass is obtained, which is proportional to the square of the neutrino Yukawa coupling f. This allows for a 125 GeV Higgs boson at the tree level for $f \sim \mathcal{O}(1)$ and still having a small tree level mass for the active neutrino. In order to fit the experimental results involving neutrino masses and mixing angles we introduce a small breaking of $U(1)_R$ symmetry, in the context of anomaly mediated supersymmetry breaking. In the presence of this small R-symmetry breaking, light neutrino masses receive contributions at the one-loop level involving the R-parity violating interactions. We also identify the right handed neutrino as a warm dark matter candidate in our model, which can also explain the 3.5 keV X-ray line, as observed in the spectra of Andromeda galaxy and various other galaxy clusters by space telescopes.

Presenter: Chakraborty Sabyasachi

O.5 – Oral, IWTCP-2

Enhanced Electron EDM with Minimal Flavor Violation

Jusak Tandean

National Taiwan University

The latest data from the ACME experiment have led to the most stringent limit to date on the electric dipole moment d_e of the electron. Nevertheless, the standard model (SM) prediction for d_e is many orders of magnitude below the new result, making this observable a powerful probe for physics beyond the SM. We perform a model-independent study of d_e in the SM plus

right handed neutrinos and its extension with the seesaw mechanism under the framework of minimal flavor violation (MFV). We find that d_e crucially depends on whether neutrinos are Dirac or Majorana fermions. In the Majorana case, d_e can reach its measured bound, which therefore constrains the scale of MFV to be above a few hundred GeV. We also consider extra CP-violating sources in the Yukawa couplings of the right-handed neutrinos. Such new sources can have important effects on d_e.

Presenter: Tandean Jusak

O.6 – Oral, IWTCP-2

Development of TNU-SuperSID teaching module for observing the effects of solar activities on the Earth's lower ionosphere

Le Minh Tan (1), Nguyen Thi Ngoc Chau (1), Hoang Thi Kim Tuyen (1) and Tran Quoc Ha (2)

(1) Faculty of Natural Science and Technology, Tay Nguyen University, Vietnam (2) Ho Chi Minh City University of Pedagogy, Vietnam

Department of Physics, Faculty of Natural Science and Technology, Tay Nguyen University, Vietnam, has collaborated with Stanford Solar Center of Stanford university on Space Weather monitor project. We have developed the TNU-SuperSID teaching module which has three main parts: antenna, preamplifier and data logger. This module can detect the variation of Very Low Frequency (VLF, 3 – 30 kHz) signals during sunrise and sunset transition, and sudden ionospheric disturbance due to solar flares. In other word, the behavior of Earth's lower ionosphere corresponding the solar activities is understood by using VLF technique. Our project helps undergraduate students who are learning the astrophysics and space physics to be enhanced their knowledge in space science and their technical skills with real experiments. Through the participant in this project, students can also be gained their skills such as communication, working in team, processing data, etc.

Presenter: Le Minh Tan

O.7 – Oral, IWTCP-2

CALCULATION FOR OPTIMIZATION OF THE EXPERIMENTAL CONDITIONS FOR RBS ANALYSIS AT THE HUS 5SDH-2 TANDEM ACCELERATOR

Vi Ho Phong (1), Le Hong Khiem (2), Nguyen The Nghia (1)

(1) Department of Physics, Hanoi University of Science (2) Institute of Physics, Vietnam Academy of Science and Technology

The parameters of RBS analysis that is under influence of experimental conditions has been investigated by the experimental methods and the theoretical calculations, i.e. the energy resolution, the accessible depth and the depth resolution. The results of theoretical calculations for the depth resolution parameter at varying incident energies and target tilting angles was verified by backscattering experiments on Au sample and they have found to be in good agreement with experimental results. The optimum analysis conditions over a wide range of RBS applications can be found by extensions of theoretical calculations. All the experiments was conducted in the RBS system at HUS 5SDH-2 Tandem accelerator.

Presenter: Le Hong Khiem

O.8 – Oral, IWTCP-2

Lithium detection in young, nearby brown dwarfs

Ngoc Phan-Bao (1)

HCM International University

We present here our search for young brown dwarfs in the solar neighbourhood (distances $<$ 30 parsecs) using the "lithium test" method. A few mid-M dwarfs show strong lithium absorption in their optical spectra. These M dwarfs are indeed young brown dwarfs.They provide benchmarks for studying basic properties of young brown dwarfs. In addition, they are excellent targets for hunting Earth-like planets.

Presenter: Ngoc Phan-Bao

P.1 – Poster, IWTCP-2

Pre-inflation fluctuations in a Open ΛCDM model

N. Q. Lan (1), N. A. Vinh (1), P. V. Hung (1), G. J. Mathews (2)

(1) Hanoi National University of Education, 136 Xuan Thuy, Hanoi, Vietnam; (2) University of Notre Dame, Center for Astrophysics, Notre Dame, IN 46556 USA

We analyze the possible constraints on parameters characterizing the pre-inflating universe in an open-inflation model with a present day very slightly open ΛCDM universe. We employ an analytic model to show that for a broad class of inflation-generating effective potentials, that the simple requirement that the observed dipole moment represent the pre-inflation curvature as it enters the horizon allows one to estimate the magnitude and wavelength scale of pre-inflation fluctuations in the inflation field, the curvature of the pre-inflation universe, and the fraction of the total energy density in the inflation field as the present horizon first entered the inflation epoch. We estimate that current constraints on cosmological parameters imply rather small curvature $\Omega k \approx 0.06$ for the pre-inflating universe and that the fraction of the total energy in the inflation field at the onset of inflation only $f \approx 0.05$. We suggest these results may be indicative open inflation models in which there two inflation epochs.

Presenter: Nguyen Quynh Lan

P.2 – Poster, IWTCP-2

Ionization of polar molecules by intense laser fields

Van-Hung Hoang (1), Van-Hoang Le (1), Anh-Thu Le (2)

(1) Department of Physics, Ho Chi Minh City University of Pedagogy, Vietnam (2) Department of Physics, Kansas State University, USA

We report theoretical calculations for ionization of polar molecules in ultra-short intense laser pulses by solving the time-dependent Schrodinger equation (TDSE) numerically. Our results for orientation dependent ionization rates from the TDSE disagree with predictions from the conventional molecular tunneling ionization (MO-ADK) theory. We further show evidence that

simple modification of the MO-ADK by taking into account the Stark correction leads to drastic improvement for simple polar molecules. Further modifications of the MOADK might be expected to accurately reproduce experimental data for more complex polar molecules.

Presenter: Hoàng Văn Hưng

P.3 – Poster, IWTCP-2

The Metric Of Extended Einstein Equation and Schwarzschild Solutions In Six Dimensions

Phan Hong Lien, Tran Huu Phat, Ha Van Chung

LeQuyDon Academy of Technology

The metric of a warped space-time with two extra dimensions is established by means of the Einstein equations in six dimensions and the compactification of two extra dimensions on a square. It is shown that at every among two fixed points our manifold reduces to the five-dimensional Randall - Sundrum space - time and the hierarchy problem could be solved. The Schwarzschild solutions in the six dimensions have also been extended.

Presenter: Phan Hong Lien

P.4 – Poster, IWTCP-2

OPERATION AND RESEARCH ACTIVITIES AT THE HUS 5SDH-2 TANDEM ACCELERATOR FACILITY

Vi Ho Phong (1), Le Hong Khiem (2), Nguyen The Nghia (1)

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In 2012, the HUS 5SDH-2 Tandem Accelerator, together with two beam line for Ion beam analysis and Ion implantation has finished commissioning. Since then, many research activities on radiation applications have been carried out. Also, many experiences have been gained during the operation of the system. In this paper, we describe the configuration of the facility and recent activities on operation, as well as some results of research on Ion Beam Analysis on the dedicated beam line.

Presenter: Vi Ho Phong

P.5 – Poster, IWTCP-2

ELEMENTAL ANALYSIS BY TTPIXE METHOD AT THE HUS 5SDH-2 TANDEM ACCELERATOR SYSTEM

Vi Ho Phong (1), Le Hong Khiem (2), Nguyen The Nghia (1)

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In this paper, capability of our Pelletron for quantitative elemental analysis by TTPIXE (Thick

Target Proton Induced X-ray Emission) method is showed. In order to optimize the accuracy of the method, calibration procedures for experimental parameters by using NIST standard samples were applied. In addition, two different measurements were conducted at different proton beam energies for determination of matrix composition and trace elements. PIXE data was acquired and analyzed by GUPIX software package. The validity of the TTPIXE method was confirmed by comparison of our results obtained with the standard samples with the corresponding reference values. TTPIXE method was then applied in analysis of environmental samples.

Presenter: Vi Ho Phong

P.6 – Poster, IWTCP-2

Gravitational Waves from Binary Neutron Stars

N. Q. Lan (1), N. A. Vinh (1), D. D. Lam (1), N. H. Trang (1), G. J. Mathews (2), I-S. Suh (2)

(1) Hanoi National University of Education, 136 Xuan Thuy, Hanoi, Vietnam; (2) University of Notre Dame, Center for Astrophysics, Department of Physics, IN 46556 USA

The relativistic evolution of neutron stars, either in a head on collision or in binary orbit is of current interest as such systems are expected to emit detectable gravitational radiation. In this work, numerical simulations of colliding neutron stars, having either a realistic or a $\Gamma = 2$ polytropic equation of state (EOS) confirm the rise in central density for the softer EOS. For the binary calculation, our results show that the neutron stars can collapse to black holes before colliding when the EOS is realistic, the central density as the stars approach, when a stiff equation of state is used. Illustrate templates for the gravitational radiation emitted from the binary are calculated and we show that the frequency of the emitted gravitational waves changes more slowly for a realistic EOS. This may result in a stronger signal in the 50-100 Hz band.

Presenter: Nguyen Quynh Lan

P.7 – Poster, IWTCP-2

Neutrino masses and mixing in an extended standard model with an A4 flavour symmetry.

Nguyen Anh Ky (1,2) and Phi Quang Van (1)

(1) Institute of physics, Hanoi, Vietnam (2) College of science, Vietnam national university, Hanoi, Vietnam

A simple method of generation of neutrino masses in an extended standard model with an A4 flavour symmetry is proposed. The method allows us to determine a mixing matrix with θ_{13} consistent with the recent experimental data.

Presenter: Phi Quang Van

P.8 – Poster, IWTCP-2

The formation mechanism of the coldest stars in the Universe

Ngoc Phan-Bao (1), Cuong Dang-Duc (1)

HCM International University - Vietnam National University

Observations of statistical properties of brown dwarfs, which are the coldest stars in the Universe, have shown that brown dwarfs form in a scaled-down version of low-mass stars. However, the formation process of these objects is poorly understood. In this talk, we present our observations of the basic properties of molecular outflows from brown dwarfs. The results may provide us with important implications that clarify the formation process of brown dwarfs.

Presenter: Phan-Bao Ngoc

P.9 – Poster, IWTCP-2

24TH THE ACTIVITY CYCLE OF THE SUN SURVEYING

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The Sun has giant powerful nuclear reactor in the center, with the electric charge at the high temperature (plasma). The activity of the Sun causes many effects on the Earth, especially at the Upper Atmosphere. Base on the properties of the activity of the Sun, people can get forecast about the activity of the Sun. However, in the reality, the progression of the Sun' activity can be different. Therefore, the surveying about this and comparing with the forecast's results are very important and necessary. This article presents the results of studying about the 24th cycle of the Sun'activity in the practice, which supports the research about the Upper Atmosphere.

Presenter: Tran Quoc Ha

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Latest results on the Higgs boson discovery and investigation at the ATLAS - LHC

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Searching for the standard model Higgs boson is one of the central missions of the Large Hadron Collider (LHC) program. Higgs productions and methods of the Higgs search at the LHC will be presented. The Higgs can be searched directly via its decay modes or indirectly via precision electroweak measurements which can give a limitation on the Higgs mass. Finally, the latest news on the Higgs boson investigation using the data collected by the ATLAS detector of the LHC will be summarised.

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