



Program & Abstracts

49th Vietnam Conference on Theoretical Physics

**HỘI NGHỊ VẬT LÝ LÝ THUYẾT VIỆT NAM
LẦN THỨ 49**



Huế

30 July-2 August 2024

- 08:30 - 10:00 P.37 – Poster
Nonlinear oscillator model of experience-based decisions and application of normal distribution on Hanoi high school entrance exam grading
Chu Thuy Anh (Institut of Physics)
- 08:30 - 10:00 P.38 – Poster
Dynamical properties of photon-added squeezing-enhanced coherent state in the Jaynes-Cummings model
Le Thi Hong Thanh (Quang Nam University)
- 08:30 - 10:00 P.39 – Poster
Efficient qutrit gates in superconducting circuits using quantum optimal control
Tran Tuan Kha (Aalto University)
- 08:30 - 10:00 P.40 – Poster
A very low bandgap line-tunnel field effect transistor with channel-buried oxide and laterally doped pocket
Nguyễn Đăng Chiến (Dalat University)
- 08:30 - 10:00 P.41 – Poster
Nonlinear multi-photon Absorption of a Strong Electromagnetic Wave with electron-acoustic phonon scattering in infinite semi-parabolic Plus semi-inverse Squared Quantum Wells .
Dung Thi Bui (VNU University of Science)
- 08:30 - 10:00 P.42 – Poster
Quantum Computing with Cat qubits
Tran Thi Thanh Huyen (Hanoi National University of Education)
- 08:30 - 10:00 P.43 – Poster
Mass imbalance effects on microcavity exciton-polariton condensates
Nguyen Thi Hau (HaNoi University of mining and geology)
- 08:30 - 10:00 P.44 – Poster
Thermodynamic properties of monolayer honeycomb spin lattice
Nguyen Tu Niem (VNU University of Science)
- 08:30 - 10:00 P.45 – Poster
W Mass Anomaly and Physics Beyond the Standard Model
Đào Thị Nhung (Phenikaa University)
- 08:30 - 10:00 P.46 – Poster
Influence of cut-off frequency effect on resonance energy transfer and Casimir-Polder interaction
Nguyen Dung Chinh (IFAS, Duy Tan University)
- 08:30 - 10:00 P.47 – Poster
Magneto-optical absorption properties of monolayer transition metal dichalcogenides including electron-phonon interaction

Presenter: Tran Thi Thanh Huyen

P.43 – Poster, VCTP-49

Mass imbalance effects on microcavity exciton-polariton condensates

Thi-Hau Nguyen(1,2), Thi-Hong-Hai Do(2) and Van-Nham Phan(3)

(1) Graduate University of Science and Technology - Vietnam Academy of Science and Technology; (2) Department of Physics, Hanoi University of Mining and Geology, Duc Thang, Bac Tu Liem, Hanoi, Vietnam; (3) Institute of Research and Development, Duy Tan University, 3 Quang Trung, Danang, Vietnam.

The interplay of the excitonic, polaritonic and photonic condensation states due to the mass difference of electrons and holes in a microcavity is examined. In the framework of the unrestricted Hartree-Fock approximation adapting to the two electronic bands with the electron-hole Coulomb attraction and light-matter coupling, we find a set of self-consistent equations evaluating the order parameters of the condensation states. The excitonic and the photonic susceptibility functions are also specified in the random phase approximation. Our numerical results release the polaritonic condensate dominance at low excitation densities once enlarging the mass imbalance. The excitonic, polaritonic and photonic condensate competition in the influence of the Coulomb interaction and mass imbalance is also discussed

Presenter: Nguyen Thi Hau

P.44 – Poster, VCTP-49

Thermodynamic properties of monolayer honeycomb spin lattice

Niem T. Nguyen, Giang H. Bach, Cong T. Bach

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The transverse Ising model is used in the thermodynamic theory of ferroic materials [1]. The Ising model in longitudinal field is used to investigate the first order magnetization process in bilayer honeycomb spin films [2]. In this research, spin systems with arbitrary spin value S in a single-layer honeycomb spin lattice have been investigated using the functional integral method and the Ising model in longitudinal and transverse fields. An expression for the free energy in the Gaussian approximation consisting of two terms has been obtained: the mean field term and the spin fluctuation term. From this, expressions for the general spin wave spectrum for different magnetic structures (ferromagnetic, antiferromagnetic, and ferrimagnetic) have been obtained. The influence of spin fluctuations on the magnetization process in an external field for a ferromagnetic structure has been examined.

References:

- [1] Cong T. Bach, Niem T. Nguyen, Giang H. Bach, Thermodynamic properties of ferroics described by the transverse Ising model and their applications for CoNb_2O_6 , J. Magn. Magn. Mater. 483 (2019) 136.
- [2] Niem T. Nguyen, Giang H. Bach, Thao H. Pham, Huy D. Nguyen, Oanh T.K. Nguyen and Cong T. Bach, Magnetization Process in Bilayer Honeycomb Spin Lattice, Materials Transactions, 64 (2023) 2118.

Presenter: Nguyen Tu Niem