

- 2025.4 제43권 제1호
- Bulletin of the Korean Physical Society
- 한국물리학회 회보

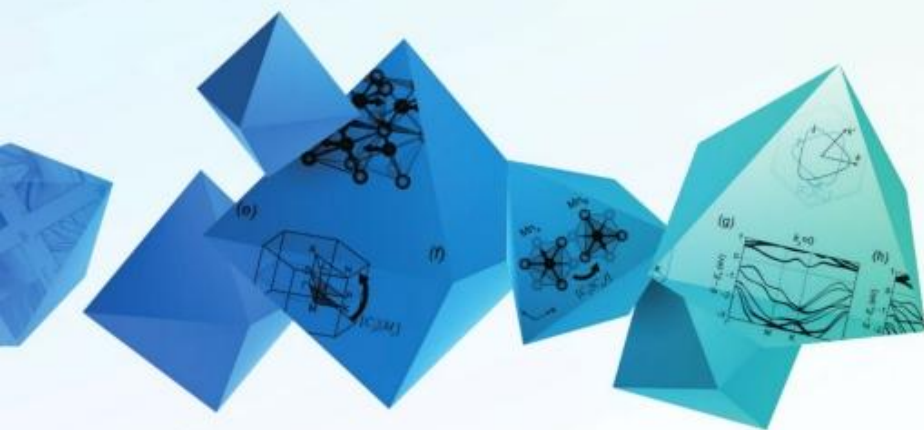
2025 KPS Spring Meeting

2025년 봄 학술논문발표회 및 제101회 정기총회



일시: 2025년 4월 23일(수) ~ 25일(금)

장소: 대전컨벤션센터 제1전시장



[G3-ap] Focus: Electrical and Optical Properties of Emerging 2D Materials: Tellerium and Bi₂O₂Se

2025. 04. 24 Thursday 16:24~18:00

Room: 103

좌장: 윤석준 울산대학교

Chair: YUN SeokJoon (University of Ulsan)

G3.01 [16:24 - 16:48]

Visualizing Line Defects in non-van der Waals Bi₂O₂Se Using Raman Spectroscopy / KIM Un Jeong^{*1} (¹Department of Physics, Dongguk University)

G3.02 [16:48 - 17:12]

Directional Deposition of Two-Dimensional Tellurium on 1T'-MoTe₂ Film / PARK Jin Young^{1,2}, MOON Min-Soo¹, HAN Gang Hee^{*1} (¹Department of Physics, Incheon National University, ²Semiconductor Engineering, Gwangju Institute of Science and Technology)

G3.03 [17:12 - 17:36]

Two-Dimensional Te-Based Semiconductor Devices beyond Von Neumann Computing Architecture / LEE Moonsang^{*1} (¹Department of Materials Science & Engineering, Inha University)

G3.04 [17:36 - 18:00]

Understanding Coulomb Scattering Mechanism in Ambipolar Materials / JOO Min-Kyu^{*1} (¹Department of Applied Physics, Sookmyung Women's University)

[G4-st] Soft Matter

2025. 04. 24 Thursday 16:24~17:48

Room: 104

좌장: 조용석 경상대학교

Chair: JHO Yong Seok (Gyeongsang National University)

G4.01 [16:24 - 16:36]

On the dynamical perspectives of cyanobacterial kaiABC circadian rhythm / LEE YeongKyu¹, HYEON Changbong^{*1} (¹School of Computational Sciences, KIAS)

G4.02 [16:36 - 16:48]

Langevin Field-Theoretic Simulations of Order-to-Disorder Transition in Block Copolymer Blends Incorporated with Well-Tempered Metadynamics / KANG Wonjun¹, JEONG Hyeon U¹, KIM Jaeup^{*1} (¹Department of Physics, UNIST)

G4.03* [16:48 - 17:00]

Direct Observation of Water Vapor Uptake in Hygroscopic Liquids by Neutron Radiography /

JEONG Joonwoo¹, AN HYEONJUN¹, KOO Youngtak¹, CHEON Jiyong¹, TRTIK Pavel² (¹Physics, UNIST, ²Laboratory for Neutron Scattering and Imaging, PSI)

G4.04* [17:00 - 17:12]

Spatiotemporal distribution of aerotactic bacteria under confinement: Effects of total number density / KIM Minjun¹, JEONG Joonwoo¹ (¹Physics, UNIST)

G4.05* [17:12 - 17:24]

Droplets, micelles and more complex structures of polyampholyte aggregates / KIM Seowon¹,

LEE Nam Kyung¹, JOHNER Albert², JUNG Youngkyun³ (¹Department of Physics and Astronomy, Sejong University, ²Institut Charles Sadron CNRS-Unistra, universit  de Strasbourg,

³Supercomputing Center, Korea Institute of Science and Technology Information)

G4.06* [17:24 - 17:36]

Elasticity of the reversible Freely Jointed Chain / YI Minsu¹, BENETATOS Panayotis¹

(¹Department of Physics, Kyungpook National University)

G4.07 [17:36 - 17:48]

Quantitative Analysis of Roles of Direct and Indirect Pathways for Action Selection in The

Basal Ganglia / KIM Sang-Yoon¹, LIM Woochang¹ (¹Department of Science Education, Daegu National University Of Education)

[G5-pl] Focus: Memorial Session for the Late Professor Moohyun Cho II

2025. 04. 24 Thursday 16:24~17:36

Room: 105

좌장: 양해룡 포항가속기연구소

Chair: YANG HAERYONG (Pohang Accelerator Laboratory)

G5.01 [16:24 - 16:48]

Superconducting RF Accelerator for Rare Isotope Science / KIM Sang-hoon¹ (¹Facility for Rare

Isotope Beams, Michigan State University, USA)

G5.02 [16:48 - 17:12]

암치료의 새로운 빛! 붕소중성자포획치료(BNCT)의 현재와 미래 (故조무현 교수님을 추모하며) / KIM

Sehyun¹, BAE Youngsoon¹, CHO Moohyun¹ (¹DAWONMEDAX CO, LTD.)

G5.03 [17:12 - 17:36]

Quantitative Analysis of Roles of Direct and Indirect Pathways for Action Selection in The Basal Ganglia

KIM Sang-Yoon ¹, LIM Woochang ^{1*}

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Abstract:

We are concerned about action selection in the basal ganglia (BG). We quantitatively analyze roles of direct pathway (DP) and indirect pathway (IP) for action selection in a spiking neural network with 3 competing channels. For such quantitative analysis, in each channel, we obtain the competition degree C_d , given by the ratio of strength of DP (S_{DP}) to strength of IP (S_{IP}) (i.e., $C_d = S_{DP} / S_{IP}$). Then, a desired action is selected in the channel with the largest C_d . Desired action selection is made mainly due to strong focused inhibitory projection to the output nucleus, SNr (substantia nigra pars reticulata) via the DP in the corresponding channel. Unlike the case of DP, there are two types of IPs; intra-channel IP and inter-channel IP, due to widespread diffusive excitation from the STN (subthalamic nucleus). The intra-channel IP plays a role of brake to suppress the desired action selection. In contrast, the inter-channel IP to the SNr in the neighboring channels suppresses competing actions, leading to highlight the desired action selection. In this way, role of the inter-channel IP is opposite to that of the intra-channel IP. However, to the best of our knowledge, no quantitative analysis for such roles of the DP and the two IPs was made. Here, through direct calculations of the DP and the intra- and the inter-channel IP presynaptic currents into the SNr in each channel, we obtain the competition degree of each channel to determine a desired action, and then roles of the DP and the intra- and inter-channel IPs are quantitatively made clear.

Keywords:

Quantitative analysis, Action selection, Basal ganglia, Competition degree, Direct pathway, Indirect pathway (IP), Intra-channel IP, Inter-channel IP