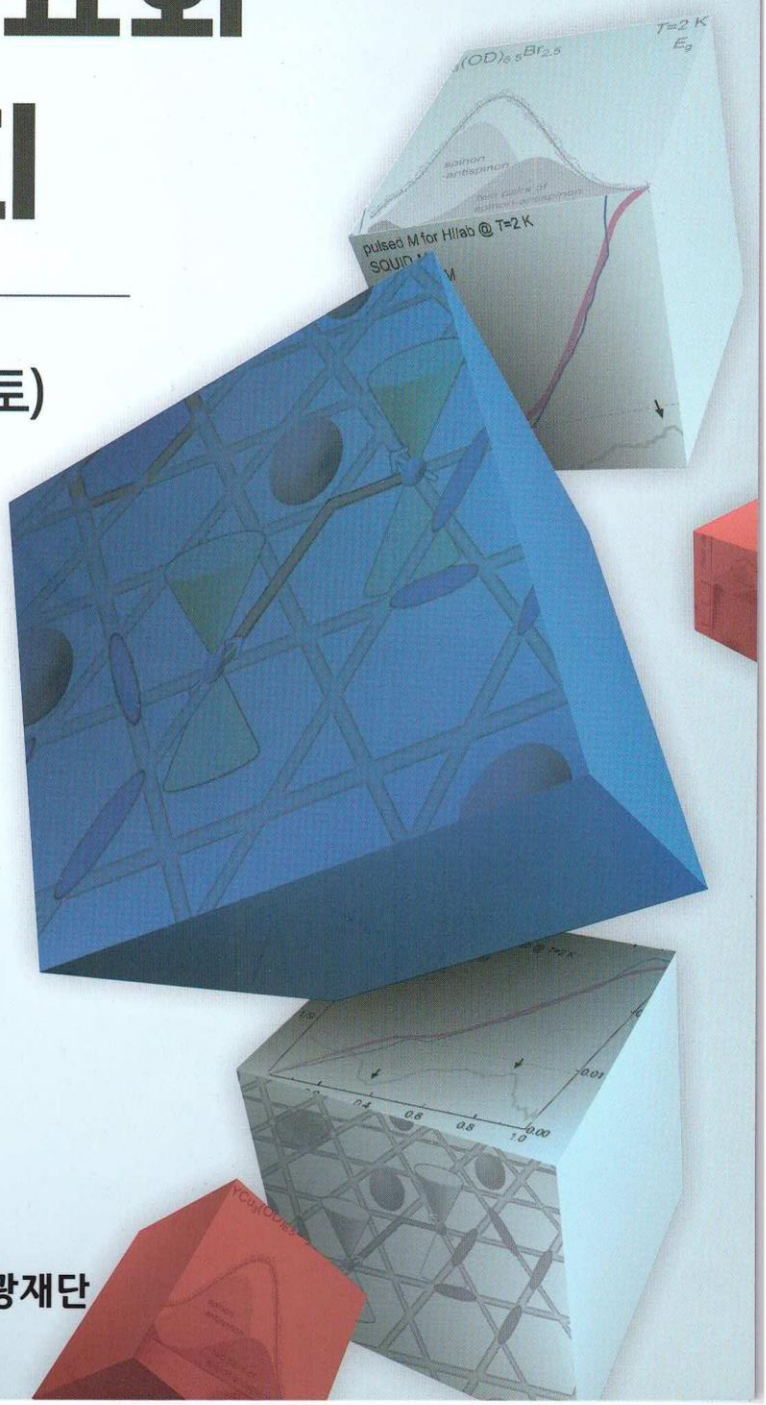
2024 KPS Fall Meeting

2024년 가을 학술논문발표회 및 임시총회

일시 : 10월 22일(화) ~ 26일(토)

장소 : 여수EXPO컨벤션센터



- 2024.10 제42권 제2호
- Bulletin of the Korean Physical Society
- 한국물리학회 회보

KPS 한국물리학회 The Korean Physical Society

후원 전라남도 관광재단

Aaron[2], YUN Hyeongock[2], CHO Sung Tae[*1], LEE Su Houng[2] ([1]Kangwon National University, [2]Department of Physics, Yonsei University)

I3.05 [11:18 - 11:30]
Exotic hadrons and three-quark potentials / PARK Aaron[*1], LEE Su Houng[1] ([1]Department of Physics and Institute of Physics and Applied Physics, Yonsei University)

I3.06* [11:30 - 11:42]
Calibration of the KOTO Downstream Charged Veto Counter / LIM SangHoon[*1], PARK Jinhyun[1], KIM Eun Joo[2], AHN Jung Keun[3], KIM Young Jun[3], LIM GeiYeob[4], KIM Junlee[5] ([1]Physics Department, Pusan National University, [2]Division of Science Education, Jeonbuk National University, [3]Physics Department, Korea University, [4]Physics Department, High Energy Accelerator Research Organization, KEK, [5]Physics Department, CERN)

I3.07 [11:42 - 11:54]
Generalized parton distributions of pion and kaon from nonlocal chiral quark model / SON Hyeondong[*1] ([1]Inha University)

I3.08* [11:54 - 12:06]
Polarization of Xi^- and Xi^* produced from (K^-,K^+) reactions at 1.8 GeV/c / AHN Jung Keun[*1], KANG Byunmin[1] ([1]Department of Physics, Korea University)

I3.09* [12:06 - 12:18]
Study of K^-p interactions near the $\eta\Lambda$ threshold / LEE Haein[1], AHN Jung Keun[*1], YANG Seongbae[1] ([1]Department of Physics, Korea University)

[I4-st] Soft Matter & Biophysics
2024. 10. 25 Friday 10:30~12:18
Room: Seminar Rm 3
좌장: **송태근** 공주대학교
Chair: SONG Taegeun (Kongju National University)

I4.01 [10:30 - 10:54]
Modulating collective dynamics in active systems through chemical consumption and chemokinetic effects / KWON Euijoon[1], OH Yongjae[1], BAEK Yongjoo[*1] ([1]Department of Physics and Astronomy, Seoul National University)

I4.02* [10:54 - 11:06]
Symmetry-breaking motility in crowded confinement: insights from the active hinge model /

GARIBALDI RIGON Leonardo[1], BAEK Yongjoo*[1] ([1]Department of Physics and Astronomy, Seoul National University)

I4.03* [11:06 - 11:18]

Motility Modulates the Partitioning of Bacteria in Aqueous Two-Phase Systems / CHEON Jiyong[1], KYUHWAN Choi[2], MODICA Kevin J.[2], ROBERT Mitchell James[1], TAKATORI Sho C.[2], JEONG Joonwoo*[1] ([1]Physics, UNIST, [2]Chemical Engineering, UCSB)

I4.04 [11:18 - 11:30]

Break-up and recovery of harmony between direct and indirect pathways in a spiking neural network of the basal ganglia / KIM Sang-Yoon[1], LIM Woochang*[1] ([1]Department of Science Education, Daegu National University Of Education)

I4.05* [11:30 - 11:42]

Conditioning a Model Spiking Neural Network for Associative Memory Formation / JEONG In Hoi[1], LEE Kyoung Jin*[1] ([1]Department of Physics, Korea University)

I4.06 [11:42 - 11:54]

The Positive Effects and Trade-offs of Spatial Noise on Pavlovian Learning in Spiking Neural Networks / KIM Jongmu[2], LEE Kyoung Jin*[1] ([1]Department of Physics, Korea University, [2]Department of Mechanical Engineering, Korea University)

I4.07* [11:54 - 12:06]

Tracking 2D trajectory of bacillus subtilis and quantifying its run-and-tumble motion / SON Joowang[1], KIM Jaeup*[1] ([1]Department of Physics, UNIST)

I4.08 [12:06 - 12:18]

Tumbling strategies for predator evasion of intelligent run-and-tumble prey / GOH Segun*[1,2], HAUSTEIN Dennis[1], GOMPPER Gerhard[1] ([1]Theoretical Physics of Living Matter (IAS-2), Forschungszentrum Jülich, [2]School of Computational Sciences, KIAS)

Ⓔ[I5-co] Pioneer: Strong Correlation in Flat Band and Quantum Geometry II

2024. 10. 25 Friday 10:30~12:18

Room: Seminar Rm 4

좌장: **신상진** 한양대학교

Chair: SIN Sang Jin (Hanyang University)

I5.01 [10:30 - 11:06]

Non-Abelian Fractional Quantum Anomalous Hall States and First Landau Level Physics in

Break-up and recovery of harmony between direct and indirect pathways in a spiking neural network of the basal ganglia

KIM Sang-Yoon [1], LIM Woochang [*1]

[1]Department of Science Education, Daegu National University Of Education

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Abstract:

The basal ganglia (BG) in the brain exhibit diverse functions for motor, cognition, and emotion. Such BG functions could be made via competitive harmony between the two competing pathways, direct pathway (DP) (facilitating movement) and indirect pathway (IP) (suppressing movement). As a result of break-up of harmony between DP and IP, there appear pathological states with disorder for movement, cognition, and psychiatry. In this paper, we are concerned about the Huntington's disease (HD), which is a genetic neurodegenerative disorder causing involuntary movement and severe cognitive and psychiatric symptoms. For the HD, the number of D2 SPNs (N_{D2}) is decreased due to degenerative loss, and hence, by decreasing x_{D2} (fraction of N_{D2}), we investigate break-up of harmony between DP and IP in terms of their competition degree C_d, given by the ratio of strength of DP (S_{DP}) to strength of IP (S_{IP}) (i.e., $C_d = S_{DP} / S_{IP}$). In the case of HD, the IP is under-active, in contrast to the case of Parkinson's disease with over-active IP, which results in increase in C_d (from the normal value). Thus, hyperkinetic dyskinesia such as chorea (involuntary jerky movement) occurs. We also investigate treatment of HD, based on optogenetics and GP ablation, by increasing strength of IP, resulting in recovery of harmony between DP and IP. Finally, we study effect of loss of healthy synapses of all the BG cells on HD. Due to loss of healthy synapses, disharmony between DP and IP increases, leading to worsen symptoms of the HD.

Keywords:

Basal ganglia, Huntington's disease, Direct pathway (DP), Indirect pathways(IP), Harmony between DP and IP