www.appc15.org

The 15th Asia Pacific Physics Conference

APPC15

August 21-26, 2022

[Online Conference]

Organized by

- Association of Asia Pacific Physical Societies
- Korean Physical Society (KPS)

Co-Organized by

- Asia Pacific Center for Theoretical Physics
- Department of Physics, Yonsei University

Sponsored by

- The Korean Federation of Science and Technology Societies

[ST] Statistical Physics

Korea Standard Time (KST = GMT + 9)	Aug. 22 (Mon)	Aug. 23 (Tue)	Aug. 24 (Wed)	Aug. 25 (Thu)	Aug. 26 (Fri)
Session Code	A19-st : Chaos and Nonlinear Dynamics	D19-st : Nonequilibrium Systems 1	G19-st : Nonequilibrium Systems 2	J19-st : Nonequilibrium Systems 3	M19-st : Nonequilibrium Systems 4
11:00-11:15	Beom Jun Kim	Yonggun Jun	Jae Sung Lee	Takashi Mori	Kenji Harada
11:15-11:30					
11:30-11:45	Hong Zhao	Hyuk Kyu Pak	Keiji Saito	Haitao Quan	Yilin Wu
11:45-12:00					
12:00-12:15	Karuppaiya Sakkaravarthi	Amit Kumar Chatterjee	Yuki Minami	Sangyun Lee	Takuya Kobayashi
12:15-12:30	Hae Seong Lee	Ki-Won Kim	Hiroyoshi Nakano	Seungwoong Ha	Won Kyu Kim
12:30-12:45		Yongjae Oh	Euijoon Kwon		
12:30-14:00	Lunch Break				
Session Code	B19-st : Disordered and Glassy Systems 1	E19-st : Disordered and Glassy Systems 2	H19-st : Mathematical Aspects and Phase Transition	K19-st : Phase Transition and Critical Phenomena 1	N19-st : Phase Transition and Critical Phenomena 2
14:00-14:15	Kazumasa A. Takeuchi	Jae Dong Noh	Bing Miao	Youjin Deng	Byungnam Kahng
14:15-14:30					
14:30-14:45	Yujie Wang	Yongjoo Baek	Synge Todo	Dong-Hee Kim	Hong-Yan Shih
14:45-15:00					
15:00-15:15	Daisuke Shimamoto	Chihiro Nakajima	Kazuhiro Fuchizaki	Tomotoshi Nishino	Naoki Kawashima
15:15-15:30	Ding Wang		Meesoon Ha		
15:30-16:00	Break	Plenary Session	Plenary Session	Break	Break
Session Code	C19-st : Quantum Statistical Physics 1	F19-st : Quantum Statistical Physics 2	I19-st : Interdisciplinary and Complex Systems 1	L19-st : Interdisciplinary and Complex Systems 2	O19-st : Soft Matters and Biological Systems
16:00-16:15	Kouichi Okunishi	Jae Dong Noh	Hang-Hyun Jo	Deok-Sun Lee	Hugues Chaté
16:15-16:30					
16:30-16:45	Akira Shimizu	Tsuyoshi Okubo	Haiping Huang	Linyuan Lu	Penger Tong
16:45-17:00					
17:00-17:15	Naomichi Hatano	Liang Huang	Woochang Lim	Seong-Gyu Yang	Pai-Yi Hsiao
17:15-17:30			Yohei Saika	Ning Yang	
17:30-17:45	Jie REN	Kansei Inamura	Gwangsu Kim	A-Young Park	Prasad Sonar
17:45-18:00			Oh-Hyun Kwon		Akinori Miyamoto

I16.02 [16:40~17:10] A quasilinear analysis of Co-existence and transition of electromagnetic proton cyclotron and electron fire hose instability.
Zain Ali*1, Muhammad Sarfraz[1], Peter Yoon[2] ([1]Department of Physics, Department of Physics, Government College University, [2]Institute for Physical Science and Technology, University of Maryland, Institute for Physical Science and Technology, University of Maryland)

I16.03 [17:10~17:25] Parametric instabilities of arc-polarized Alfven waves revisited
Yasuhiro Nariyuki*1 ([1]Faculty of Education, Academic Assembly, University of Toyama)

[I17-qi] Quantum computing 3

2022 Aug. 24 (Wed) 16:10~17:25 Room: 17

Chair: Neill Lambert (RIKEN)

I17.01 [16:10~16:40] Dispersive read-out of the Rydberg States: towards realizing spin qubits using electrons on helium
Erika Kawakami*1 ([1]RIKEN Center for Quantum Computing, RIKEN)

I17.02 [16:40~16:55] Optimal adiabatic evolution of Rydberg atom arrays
Minhyuk Kim[1], Kangheun Kim[1], Jaewook Ahn*1 ([1]Department of Physics, Korea Advanced Institute of Science and Technology)

I17.03 [16:55~17:25] Non-Bloch parity-time symmetry and exceptional points
Peng Xue*1 ([1]Quantum Physics and Quantum Information Division, Beijing Computational Science Research Center)

[I18-se] Spin Phenomena and Quantum Information 2

2022 Aug. 24 (Wed) 16:10~17:10 Room: 18

Chair: Jiun-Yun Li (National Taiwan University)

I18.01 [16:10~16:40] Photon-spin quantum interface based on gate-define semiconductor quantum dots
Akira Oiwa*1 ([1]SANKEN, Osaka University)

I18.02 [16:40~17:10] Tip-enhanced cavity-spectroscopy
Kyoung-Duck Park*1 ([1]Department of Physics, Pohang University of Science and Technology (POSTECH))

[I19-st] Interdisciplinary and Complex Systems 1

2022 Aug. 24 (Wed) 16:10~18:10 Room: 19

Chair: Deok-Sun Lee (Korea Institute for Advanced Study)

I19.01 [16:10~16:40] Temporal scaling behaviors in bursty time series
Hang-Hyun Jo*1 ([1]Department of Physics, The Catholic University of Korea)

I19.02 [16:40~17:10] Symmetry breaking in unsupervised learning: from generative to memory models
Haiping Huang*1 ([1]School of Physics, Sun Yat-sen University)

I19.03 [17:10~17:25] Effect of the adult-born immature granule cells on the winner-take-all competition in a biological network of the hippocampal dentate gyrus
Sang-Yoon Kim*1, Woochang Lim[1] ([1]Department of Science Education, Daegu National University of Education)

Effect of the adult-born immature granule cells on the winner-take-all competition in a biological network of the hippocampal dentate gyrus

Sang-Yoon Kim*, Woochang Lim*

Institute for Computational Neuroscience and Department of Science Education, Daegu National University of Education, Daegu 42411, Korea

Email: S-Y Kim: sykim@icn.re.kr
W. Lim: wclim@icn.re.kr

Adult neurogenesis occurs in the hippocampal dentate gyrus (DG) throughout life. Thus, young immature granule cells (imGCs) appear in adulthood. In comparison to mature GCs (mGCs) (born during development), young adult-born imGCs exhibit two competing distinct properties such as high excitability (causing high activation) and low excitatory innervation (reducing activation). We develop a spiking neural network for the DG, incorporating the imGCs, and investigate their effect on the winner-take-all (WTA) competition. When considering the high excitability of imGCs, the imGCs become very highly active, while the mGCs exhibit very sparse firing activity because of strongly increased feedback inhibition from the BCs and the HIPP cells (caused by the high activation of the imGCs). Thus, the whole population of all the GCs become a very heterogeneous one, composed of a (major) subpopulation of mGCs (exhibiting strengthened WTA competition) and a (minor) subpopulation of imGCs (showing weakened WTA competition). Next, we consider the low excitatory innervation of the imGCs (resulting in sparse firing), which could counteract the effect of high excitability. As excitatory innervation of the imGCs is decreased, the activation degree of the imGCs decreased so rapidly (i.e., their WTA competition increased), while the activation degree of the mGCs increased (i.e., their WTA competition decreased). As the effect of the imGCs is decreased, the heterogeneity degree in the whole population became reduced.