

2023 IBS-CALDES Seminar

- ✓ **Date & Time:** 3:00PM, November 21 (Tue), 2023
- ✓ **Venue:** IBS POSTECH Campus Bldg. 104 (Auditorium)
- ✓ **Speaker & Title**

3:00PM~ Prof. Jae Hoon KIM (Yonsei University)
Terahertz Spectroscopy of Quantum Materials

4:10PM~ Prof. Chang Uk JUNG (Hankuk University of Foreign Studies)

I) What if we see the world with PHYSICS eye?

Bus seat/ NEW string theory/ Jack Sparrow, HAN SeokBong, and Physics

II) Discovery of ‘Topotactic resistance switching RAM’

Organized by **Prof. Han Woong YEOM**(yeom@postech.ac.kr, 054-260-9000)
Dr. Jhinhwan LEE (jhinhwan@ibs.re.kr, 054-260-9014)

■ **4:10PM~**

I) What if we see the world with PHYSICS eye?

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II) Discovery of ‘Topotactic resistance switching RAM’

Chang Uk JUNG

Department of Physics, Hankuk University of Foreign Studies

Han SeokBong was a renown penman that contributed to the Joseon dynasty’s diplomacy with the Ming dynasty (Chinese) during the Imjin war (Lee, 2009). After 5 years of practicing writing, Han SeokBong decided that he had mastered the skills of calligraphy and attempts to leave his practice space in the woods to join the bureaucracy. In response to SeokBong’s decision, his mother makes a proposition, saying “I will turn off the candle. If you can write in the dark as well as I cut this rice cake in the dark, I approve of your choice to join the bureaucracy this soon.” I as a physicist will prove that the contest between Seokbong and his mom was unfair! Although physics is full of profound and beautiful theories, you can use your imagination alone to apply simple theories in a profound and beautiful way. If time allows, I will add a few of my original talks that shows simple physics can show totally different world.; where to sit on a public bus, a new string theory(why a fiber string was attached to a pull of a zipper of sportswear/bag)

I discovered ‘topotactic ReRAM in 2014 with simple but first tried strategy. Resistance switching random access memory(ReRAM) is a very promising candidate to replace conventional Si-based memory. However, non-uniformity in key switching parameters and low endurance observed for devices based on polycrystalline metal oxide thin films has been delaying a practical application. Here, a strategy to overcome the aforementioned problems is unveiled by using oxides having a brownmillerite structure such as SrFeO_{2.5} and SrCoO_{2.5}. Our most recent device based on SrFeO_{2.5} displayed very high endurance over 10⁷ cycles and high-speed switching time of 10 ns. The multivalency nature of Fe(Dr Jekyll and Mr Hyde) ion was found be very efficient way to get speed, stability, gradual switching

--HAN SeokBong, and Physics <http://webzine.kps.or.kr/contents/index.php?process=ok&mode=count&id=webzine&cid=12996>

--Topotactic ReRAM) Adv Mater (2013), 25, p3651/ Appl. Phys. Lett. (2014), 105, p063507./ACS Appl. Mater. Interfaces (2016), 8, p7902/ Nanoscale, (2017), 9, 10502/ Scientific Report , 9:1188 (2019)/ Adv. Mat. 1903391 (2019).

--USA Patent (15/322/711) filed on 2016-12-29

Title- Memory Device for Resistance Switching Using Materials Having a Brownmillerite Structure