Topology in van der Waals antiferromagnets

Je-Geun Park（jgpark10@snu.ac.kr）
Department of Physics & Astronomy, Seoul National University, Korea

Abstract: Two-dimensional (2d) magnetism has been central to decades-long research as it offers the cleanest test bed for new ideas and physics. The prime example is the Berezinskii–Kosterlitz–Thouless transition of the XY model, which was discovered in the early 1970s. It heralds the beginning of topological physics, a new chapter in condensed matter physics. Despite the immense interest from the theoretical side, there has been relatively slow progress on the experimental side: most of which has depended on either quai-2d materials or thin films grown by a pulsed laser deposition technique.
However, the discovery of van der Waals magnets in 2016 has completely transformed the field of 2d magnetism by providing natural 2d magnets that can be experimentally studied using many tools [1-4]. Despite their short lifetime, van der Waals magnets have been used for excitingly interesting reports and ideas. With so many successes, the eyes now turn to new directions: exploring possible topological physics in 2d van der Waals magnets. In my talk, I will examine several cases of real examples [5,6].

[1] Je-Geun Park, J. Phys. Condens. Matter 28, 301001 (2016).
[2] Cheng-Tai Kuo et al., Scientific Reports 6, 20904 (2016).
[3] Jae-Ung Lee et al., Nano Lett. 16, 7433–7438 (2016).
[4] Kenneth S. Burch, David Mandrus, and Je-Geun Park, Nature 563, 47 (2018).
[5] Pyeongjae Park et al., npj Quantum Materials 7, 42 (2022).
[6] Pyeongjae Park et al., (submitted): arXiv:2303.03760.

Bio: Je-Geun Park is currently leading a research center focused on quantum materials supported by the Korean National Research Foundation and the Samsung Science and Technology Foundation. His group has made several world-first reports in the area of strongly correlated electron systems, in particular magnetism and neutron/x-ray scattering. The latest example is the discovery of van der Waals magnets: in 2016, his group, for the first time, succeeded in realising true two-dimensional magnetism using naturally occurring materials. He has been actively involved in several national and international academic activities. He was the founding chair of the Division of Condensed Matter Physics, the Association of the Asia-Pacific Physical Societies. He has been a core member of several internationa

conferences: APCTP-Quantum Materials Symposium (2014-present); the Korea-Japan-Taiwan Symposium on Strongly Correlated Electron Systems (2000-present); International Conference on Strongly Correlated Electron Systems (SCES). He is the conference chair of the SCES2023, which will be held in July in Korea.