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Non-hysteretic colossal magnetoelectric effect in a collinear antiferromagnet YOON SEOK OH, Dept. of Phys. & Astro., Rutgers, SERGEY ARTYUKHIN, Dept. of Phys.& Astro., Rutgers, JUN JIE YANG, Laboratory for Pohang Emergent materials, Postech, Korea, VIVIEN ZAPF, JAE WOOK KIM, Los Alamos Natl Lab, Natl High Magnet Field Lab, Los Alamos, DAVID VANDERBILT, SANG-WOOK CHEONG, Dept. of Phys. & Astro., Rutgers — Electric field control of magnetization has attracted lots of attention because of its potential applications for magnetoelectric devices such as memory, sensors and oscillators, as well as a fundamental interest. Recently, large magnetoelectric responses have been reported in various magnetoelectric systems. Most of the colossal magnetoelectric effects are in response to domain wall motion associated with the phase coexistence and metastability at the 1st order phase transition. This nature leads to hysteretic behavior of the magnetoelectric response. In applications for sensors and oscillators, the hysteresis plays a role of detrimental side-effect such as low precision, drift and asymmetric oscillation. In this talk, we demonstrate non-hysteretic colossal magnetoelectric effect in a collinear antiferromagnet and discuss colossal magnetoelectric response of magnetization as well as polarization associated with the continuous spin-flop transition.

Yoon Seok Oh
Department of Physics and Astronomy, Rutgers University

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