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Pairing and Self-Organization of Vortices and Antivortices in h-$YMnO_3$ S.C. CHAE, Y. HORIBE, Rutgers Center for Emergent Materials and Department of Physics and Astronomy, Rutgers University, Piscataway, New Jersey 08854, USA, D.Y. JEONG, Department of Mathematics, Soongsil University, Seoul 156-743, Korea, S. RODAN, N. LEE, S.-W. CHEONG, Rutgers Center for Emergent Materials and Department of Physics and Astronomy, Rutgers University, Piscataway, New Jersey 08854, USA — Fascinating vortices and antivortices with ferroelectric domains were discovered in multiferroic hexagonal $YMnO_3$ [1]. Interlocking of ferroelectric and structural antiphase domain walls of h-$YMnO_3$ is one of the important ingredients for the topologically-nontrivial domain pattern formation. We have recently investigated the large-scale configuration of vortices and antivortices in h-$YMnO_3$ using selective chemical etching. Our results indicate the importance of pairing of vortices and antivortices, and provide valuable insights into understanding the self-organization mechanism of a zoo of vortices and antivortices. Furthermore, we have studied the response of the vortices and antivortices configuration to external stimuli such as external electric fields.

[1] T. Choi et al., Nature Mater. **9**, 253 (2010).

S. C. Chae
Rutgers Center for Emergent Materials and Department of Physics and Astronomy, Rutgers University, Piscataway, New Jersey 08854, USA

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