

Abstract Submitted
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BaFe₂Se₃: A high TC magnetic multiferroic with large ferrielectric polarization SHUAI DONG, Southeast University, JUNMING LIU, Nanjing University, ELBIO DAGOTTO, University of Tennessee, Knoxville & Oak Ridge National Laboratory — The iron-selenides are important because of their superconducting properties. Here, an unexpected phenomenon is predicted to occur in an iron-selenide compound with a quasi-one-dimensional ladder geometry: BaFe₂Se₃ should be a magnetic ferrielectric system, driven by its magnetic block order via exchange striction. A robust performance (high T_C and large polarization) is expected. Different from most multiferroics, BaFe₂Se₃ is ferrielectric, with a polarization that mostly cancels between ladders. However, its strong magnetostriction still produces a net polarization that is large ($\sim 0.1 \mu\text{C}/\text{cm}^2$) as compared with most magnetic multiferroics. Its fully ferroelectric state, with energy only slightly higher than the ferrielectric, has a giant improper polarization $\sim 2 - 3 \mu\text{C}/\text{cm}^2$.

[1] S. Dong, J.-M. Liu, E. Dagotto, Phys. Rev. Lett. 113, 187204, (2014)

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