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Goldstone-like states in a layered perovskite with frustrated polarization[1] SERGE NAKHMANSON, Argonne National Laboratory, IVAN NAUMOV, Hewlett-Packard Information and Quantum Systems Laboratory — With the help of first-principles-based computational techniques, we demonstrate that Goldstone-like states can be artificially induced in a layered-perovskite ferroelectric compound with frustrated polarization, resulting in emergence of a variety of interesting physical properties that include large, tunable dielectric constants and an ability to easily form vortex polar states in a nanodot geometry. In a similar fashion to the well-known perovskite materials with morphotropic phase boundaries (MPBs), these states manifest themselves as polarization rotations with almost no energy penalty, suggesting that the existence of an MPB is actually yet another manifestation of the Goldstone theorem in solids.

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