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Half-Magnetization Plateau of a Dipolar Spin Ice in a [100] Field

YING-JER KAO, SHENG-CHING LIN, Department of Physics, National Taiwan University — We report here numerical results of the low-temperature behavior of a dipolar spin ice in a magnetic field along the [100] direction. Tuning the magnetic field, the system exhibit a half-magnetization plateau at low temperature. This half-polarized phase should correspond to a quantum solid phase in an effective 2D quantum boson model, and the transition from the Coulomb phase with a power-law correlation to this state can be regarded as a superfluid to a quantum solid transition. We discuss possible experimental signatures of this half-polarized state.

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