Abstract Submitted
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Non-Gaussian resistance noise in misfit layer compounds: Bi-Se-Cr LINTAO PENG, Electrical Engineering and Computer Science Applied Physics, Northwestern University, Evanston, IL 60208, USA, ALEX FREEDMAN, Electrical Engineering and Computer Science, Northwestern University, Evanston, IL 60208, USA, SAMANTHA CLARKE, DANNA FREEDMAN, Department of Chemistry, Northwestern University, Evanston, IL 60208, USA, M GRAYSON, Electrical Engineering and Computer Science Applied Physics, Northwestern University, Evanston, IL 60208, USA — Misfit layer ternary compounds Bi-Se-Cr have been synthesized and structurally and magnetically characterized [1]. However, the nature of the magnetic ordering below the transition temperature remains debatable between ferromagnetic and spin-glass. These misfit layer compounds consist of two alternating chalcogenide layers of CrSe2 and BiSe along the c-axis. Whereas the a-axis is lattice matched, the lattice mismatch along the b-axis introduces non-periodic modulation of atomic position leading to quasi-crystalline order along the b-axis alone. We explore unconventional electrical transport properties in the noise spectrum of these compounds. After thinning down the compounds to nanoscale, Van der Pauw devices are fabricated with standard electron beam lithography process. Large resistance noise was observed at temperature below the Cure temperature. The magnitude of resistance noise is much greater than trivial intrinsic noises like thermal Johnson noise and increases as temperature decreases. The probability density function of the relative noise shows 2-4 peaks among different observations which indicate strong non-Gaussian statistic property suggesting glassy behaviors in this material.
[1] S. M. Clarke and D. E. Freedman, Inorg. Chem. 54, 2765-2771 (2015)

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