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Evidence of gate-tunable topological excitations in two-dimensional electron system R. KOUSHIK, Department of Physics, Indian Institute of Science, Bangalore, MATTHIAS BAENNINGER[1], VIJAY NARAYAN, Cavendish Laboratory, University of Cambridge, J.J.Thomson Avenue, Cambridge; UK, SUBROTO MUKERJEE, Department of Physics, Indian Institute of Science, Bangalore, MICHAEL PEPPER, Department of Electronic and Electrical Engineering, University College London, Torrington Place, London, IAN FARRER, DAVID RITCHIE, Cavendish Laboratory, University of Cambridge, J.J.Thomson Avenue, Cambridge; UK, ARINDAM GHOSH, Department of Physics, Indian Institute of Science, Bangalore — We report experimental observation of a new mechanism of charge transport in two-dimensional electron systems (2DES) in the presence of strong Coulomb interaction and disorder. We show that at low enough temperature the conductivity tends to zero at a non-zero carrier density, which represents the point of essential singularity in a Berezinskii-Kosterlitz-Thouless (BKT)-like transition. Our experiments with many 2DESs in GaAs/AlGaAs heterostructures suggest the charge transport at low carrier densities to be due to the melting of an underlying ordered ground state through proliferation of topological defects. Independent measurement of low-frequency conductivity noise supports this scenario.

[1] R. Koushik *et al.*, Phys. Rev. B **83**, 085302 (2011)
[2] M. Baenninger *et al.*, Phys. Rev. Lett. **100**, 016805 (2008).

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