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Hall effect detection of time-reversal symmetry breaking under AC driving ALEXEI CHEPELIANSKII, SOPHIE GUERON, Univ. Paris-Sud, CNRS, UMR 8502, F-91405, Orsay, France, FREDERIC PIERRE, ANTONELLA CAVANNA, BERNARD ETIENNE, Laboratoire de Photonique et de Nanostructures (LPN)-CNRS, ro ute de Nozay, 91460 Marcoussis, France, HELENE BOUCHIAT, Laboratoire de Physique des Solides, Universite Paris Sud, Orsay France, GROUPE DE PHYSIQUE MÉSOSCOPIQUE TEAM, LABORATOIRE DE PHOTONIQUE ET DE NANOSTRUCTURES COLLABORATION — In a four terminal sample microscopic time-reversibility leads to symmetry relations between resistance measurements where the role of current and voltage leads are exchanged. These reciprocity relations are a manifestation of general Onsager-Casimir symmetries in equilibrium systems. We investigate experimentally the validity of time reversal symmetry in a $GaAs/Ga_{1-x}Al_xAs$ Hall bar irradiated by an external AC field at zero magnetic fields. For inhomogeneous AC fields we find strong deviations from reciprocity relations and show that their origin can be understood from the the billiard model of a Hall junction. Under homogeneous irradiation the symmetry is more robust indicating that time-reversal symmetry is preserved.

Alexei Chepelianskii
Laboratoire de Physique des Solides, Universite Paris Sud, Orsay France

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