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Charge Fractionalization in a Mesoscopic Ring WADE DEGOTTARDI, SIDDHARTHA LAL, SMITHA VISHVESHWARA, University of Illinois at Urbana-Champaign — In interacting one-dimensional systems, Luttinger liquid theory predicts the existence of fractionally charged quasiparticles whose properties depend on the Luttinger parameter. Recent experiments performed on quantum wires suggest the observation of such fractionalization. A complication that needs to be carefully considered in these geometries is that all measurements ultimately involve electrons that have tunneled outside the one-dimensional system into leads. Here, we propose a means of bypassing this complication by introducing a ring geometry and focusing on the non-invasive measurement of the time averaged power dissipated in a pickup loop proximate to the ring. We show that signatures of fractionalization of an electron that has tunneled into the ring are present in the dissipated power profile around the ring. As an independent measurement, we also show that the Luttinger parameter in the ring geometry can be derived from Coulomb blockade resonances controlled by both a tunable chemical potential and an Aharonov-Bohm flux.

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