

Abstract Submitted  
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**Superpoissonian noise with positive current correlations**

YUANZHEN CHEN, RICHARD WEBB, USC Nanocenter, University of South Carolina — We report shot noise cross correlation measurements in a beam splitter configuration. We fabricated our devices in a two dimensional electron gas in a GaAs/AlGaAs heterostructure using a splitting gate technology. Electrons tunneling across tunnel barriers are incident on a beam splitter and are scattered into two different channels. Shot noise cross correlation between the two electrical currents is measured as a function of both the transmission coefficient of the beam splitter and the Fano factor of the tunnel barriers. Due to the Fermi statistics of electrons, such a measurement usually yields a negative correlation. However, in some barriers under certain circumstances, a positive correlation has also been observed. A correspondence between the Fano factor of the tunnel barriers and the cross correlation has been established. For example, positive cross correlation is always associated with barriers exhibiting superpoissonian shot noise (with a Fano factor greater than one). Studies on the frequency dependence of shot noise suggest that the observed positive cross correlation can be related to the dynamics of localized states in the tunnel barriers.

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