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Hanbury Brown –Twiss type exchange effects in a four terminal diffusive conductor JAYANTA SARKAR, ANTTI PUSKA, O.V Lounasmaa Laboratory, LTL, Aalto University, Finland, AKIRA HIDA, Advanced device laboratory, RIKEN, Japan, MACIEJ WEISNER, Adam Mickiewicz University, Poland, PERTTI HAKONEN, O.V Lounasmaa Laboratory, LTL, Aalto University, Finland — We have investigated current-current correlations in a mesoscopic four-terminal diffusive conductor, and performed an electronic equivalent of Hanbury Brown - Twiss (HBT) type of experiment. In the experiment, cross -spectrum noise between two terminals of a cross is measured in three different bias configurations and exchange correction factor $\Delta S = |SC| - |SA| - |SB|$ [1] is calculated from these measurements. In the non-interacting regime, we find an increase in ΔS with bias from the thermal limit and with further increase in bias the ΔS becomes bias independent [2]. In contrast to the diffusive cross, our measurements on metallic islands yielded strong HBT-type of correlations that agree with the expected intrinsic correlations in a four-terminal cavity coupled to reservoirs by weak tunneling contacts. Moreover, we find non-classical HBT contributions for the case of interacting electrons (hot electrons), where ΔS is found to be negative.

[1] Ya. M. Blanter, M. Büttiker, Phys. Rev. B **56**, 2127 (1997).

[2] E. V. Shukhorukov, D. Loss, Phys. Rev. B **59**, 13054 (1999).

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