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Occupation number entanglement in mesoscopic conductors DAVID DASENBROOK, University of Geneva, Switzerland, CHRISTIAN FLINDT, Aalto University, Finland — The controlled entanglement of electrons in mesoscopic conductors has been theoretically investigated before using the spin- and orbital degrees of freedom. By contrast, entanglement of two spatially separated electronic channels using the fermionic occupation number has mostly been considered inaccessible due to the charge superselection rule. However, using non-local measurements or combining several copies of occupation number entangled states, the superselection rules can be lifted and the entanglement can be detected using current and noise measurements. We present the theory for an interferometric setup to detect entanglement in the electron-hole degree of freedom of electronic excitations [1] as well as a mesoscopic setup that demonstrates entanglement and non-locality of a single electron. [1] D. Dasenbrook and C. Flindt, Phys. Rev. B 92, 161412(R) (2015)

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