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Gigahertz quantized charge pumping through bottom gate defined InAs nanowire quantum dots ANDREAS BAUMGARTNER, MINKYUNG JUNG, SAMUEL D'HOLLOSY, University of Basel, Switzerland, VITALY GUZENKO, Paul Scherrer Institute, Switzerland, MORTEN MADSEN, JESPER NYGARD, University of Copenhagen, Denmark, CHRISTIAN SCHÖNENBERGER, University of Basel, Switzerland — We demonstrate charge pumping of individual electrons through a highly tunable InAs nanowire quantum dot at frequencies up to 1.2 GHz. The dot is induced electrostatically in the nanowire by a series of local bottom gates. A periodic modulation of a single gate is sufficient to obtain a dc current proportional to the applied frequency. We show how the dc bias, the modulation amplitude and the voltages on the local gates can be used to control the number of charges conveyed per cycle, which leads to characteristic current plateaus as a function of the respective parameter. In addition, we discuss the accuracy of the current plateaus and the impact of non-adiabatic electron distributions at large frequencies. Quantized charge pumping in InAs nanowires is relevant for current standards in metrology due to the typically large level spacing, and opens up the opportunity to investigate a variety of exotic states and transport processes using single electron spectroscopy and single electron correlation experiments, for example in Majorana bound states or in a Cooper pair splitter.

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