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Quasi-ballistic transport through surface states of Ge(001)-c(4x2) demonstrated by two-probe STM measurements and multi-terminal fist-principles simulations — •Pedro Brandimarte[1], Marek Kolmer[2], Hiroyo Kawai[3], Thomas Frederiksen[1,4], Aran García-Lekue[1,4], Nicolas Lorente[5], Mads Engelund[5], Rafal Zuzak[2], Szymon Godlewski[2], Christian Joachim[6], Marek Szymonski[2], and Daniel Sánchez-Portal[1,5] — [1]DIPC, Spain — [2]NANOSAM-UNIWERSYTET JAGIELLO, Poland — [3]IMRE, Singapore — [4]IKERBASQUE, Spain — [5]CFM CSIC-UPV/EHU, Spain — [6]CNRS, France

Dangling-bond (DB) dimer wires on both Si and Ge(001):H substrates were predicted to be robust against electron doping and capable of sustaining ballistic transport [1]. The ability to fabricate high-quality DB-dimer wires on Ge(001):H was demonstrated and their transport properties were measured in atomic level using a two-probe scanning tunneling microscope (STM) setup [2].

We present a joint theoretical and experimental study of the electronic transport through DB-dimer wires on bare Ge(001) surfaces. First-principles calculations (DFT+NEGF [3]) of a four-terminal setup were carried out to simulate the two-tip experiment. Our results confirm the capability of the DB-dimer wires to sustain quasi-ballistic transport, and opens the possibility to their use as interconnects for atomic-scale devices fabricated on these surfaces.

[1] M.Engelund *et al.* JPCC **120**, 20303 (2016). [2] M.Kolmer *et al.* JPCM **29**, 444004 (2017). [3] N.Papior *et al.* CPC **212**, 8 (2017).

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