Abstract Submitted
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Tunnelling in graphene - boron nitride - graphene heterostructures: momentum and chirality conservation ARTEM MISHCHENKO, JHIH-SIAN TU, YANG CAO, School of Physics and Astronomy, University of Manchester, Manchester M13 9PL, UK, JOHN WALLBANK, Physics Building, Lancaster University, Bailrigg, Lancaster LA1 4YB, UK, MARK GREENAWAY, School of Physics and Astronomy, University of Nottingham, University Park, Nottingham NG7 2RD, UK, MENGJIAN ZHU, COLIN WOODS, School of Physics and Astronomy, University of Manchester, Manchester M13 9PL, UK, VLADIMIR FAL'KO, Physics Building, Lancaster University, Bailrigg, Lancaster LA1 4YB, UK, LAURENCE EAVES, School of Physics and Astronomy, University of Nottingham, University Park, Nottingham NG7 2RD, UK, ANDRE GEIM, KONSTANTIN NOVOSELOV, School of Physics and Astronomy, University of Manchester, Manchester M13 9PL, UK — A new series of tunnel transistors will be presented: devices in which the two graphene layers are crystallographically aligned to a high degree of precision during the fabrication procedure. This critical step leads to resonant tunnelling and negative differential conductance in these heterostructures due to energy, momentum and chirality conservation, when two graphenes are rotationally aligned. I will also provide an intuitive geometric explanation of the physics of these twist-controlled transistors and show how the resonance peak and negative differential conductance in the device characteristics induce a tuneable radiofrequency oscillatory current that has potential for future high-frequency technology (potentially in THz regime).

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