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The magnetic ratchet effect in bilayer graphene EDWARD MCCANN, NARJES KHEIRABADI, Physics Department, Lancaster University, Lancaster, LA1 4YB, UK, VLADIMIR FAL'KO, National Graphene Institute, The University of Manchester, Manchester, M13 9PL, UK — Experiments [1] have measured a magnetic ratchet effect for electrons in hydrogenated monolayer graphene, an effect in which a d.c. electric current is generated from an a.c. electric field in the presence of an in-plane magnetic field and spatial asymmetry. Here, we describe the theory of the magnetic ratchet effect in bilayer graphene. The Boltzmann kinetic equation [2,3] is used to relate the d.c. current to the scattering probability of electrons in bilayer graphene. Taking into account details of the low-energy band structure of bilayer graphene, including interlayer hopping parameters, we compare contributions arising from gate- and disorder-induced spatial asymmetry, illustrating that bilayer and multilayer graphenes are natural candidates for the study of non-linear transport effects. [1] C. Drexler et al, Nature Nanotechnology 8, 104 (2013). [2] V. I. Fal'ko, Sov. Phys. Solid State 31, 561 (1989). [3] S. A. Tarasenko, Phys. Rev. B 83, 035313 (2011).

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