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Title

Relativistic graphene ratchet on semidisk Galton board

Source

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Abstract

Using extensive Monte Carlo simulations we study numerically and analytically a photogalvanic effect, or ratchet, of directed electron transport induced by a microwave radiation on a semidisk Galton board of antidots in graphene. A comparison between usual two-dimensional electron gas (2DEG) and electrons in graphene shows that ratchet currents are comparable at very low temperatures. However, a large mean free path in graphene should allow to have a strong ratchet transport at room temperatures. Also in graphene the ratchet transport emerges even for unpolarized radiation. These properties open promising possibilities for room temperature graphene based sensitive photogalvanic detectors of microwave and terahertz radiation. (29 References).