Magnetism in Nanopatterned Graphene and Graphite Film

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— We report first-principles calculations of magnetic properties of nanopatterned graphene-based nanostructures (GBNs) and nanopatterned graphite films (NPGFs). We introduce a simple geometric rule to design several novel magnetic GBNs: 0D FM nanodots with the highest possible magnetic moments, 1D FM nanoribbons, and 2D magnetic superlattices, whose predicted ground-state magnetic ordering is confirmed by first-principles calculations. Furthermore, we show that nanopatterned graphite films (NPGFs) can exhibit magnetism similar to GBNs. In particular, graphite films with patterned nanoscale triangular holes and channels with zigzag edges all have ferromagnetic ground states.

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