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Electrically tunable quantum anomalous Hall effect in graphene deco-
rated by $5d$ transition-metal adatoms HONGBIN ZHANG, Forschungszentrum Juelich, Germany, CESAR LAZO, University of Kiel, Germany, STEFAN BLÜGEL, Forschungszentrum Juelich, Germany, STEFAN HEINZE, University of Kiel, Germany, YURIY MOKROUSOV, Forschungszentrum Juelich, Germany — Based on first-principles calculations, we predict that $5d$ transition-metals on graphene present a unique class of hybrid systems exhibiting topological transport effects that can be manipulated effectively by external electric fields [1]. The origin of this phenomenon lies in the exceptional magnetic properties and the large spin-orbit interaction of the $5d$ metals leading to significant magnetic moments accompanied with colossal magnetocrystalline anisotropy energies. A strong magneto-electric response is predicted that offers the possibility to switch the spontaneous magnetization direction by moderate electric fields, enabling an electrically tunable quantum anomalous Hall effect.

[1] preprint: http://arxiv.org/abs/1108.5915

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