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Long range repulsive interactions in Fe on epitaxial graphene[1]
MYRON HUPALO, Ames Laboratory - U.S. Department of Energy, Iowa State University, XIAOJIE LIU, State Key Laboratory of Theoretical and Computational Chemistry, Institute of Theoretical Chemistry, Jilin University, Changchun, Jilin 130021, P. R., STEVEN BINZ, CAI-ZHUANG WANG, Ames Laboratory - U.S. Department of Energy, Iowa State University, WEN-CAI LU, State Key Laboratory of Theoretical and Computational Chemistry, Institute of Theoretical Chemistry, Jilin University, Changchun, Jilin 130021, P. R., PATRICIA THIEL, KAI-MING HO, Ames Laboratory - U.S. Department of Energy, Iowa State University, EDWARD CONRAD, School of Physics Georgia Institute of Technology, Atlanta, Georgia 30332, USA, MICHAEL TRINGIDES, Ames Laboratory - U.S. Department of Energy, Iowa State University, NANOSURF TEAM — The understanding of metal nucleation on graphene is essential for promising future applications, especially of magnetic metals which can be used in spintronics. A common method to study the grown morphology is to measure the nucleated island density n as a function of growth parameters. Surprisingly the growth of Fe on graphene is found not to follow classical nucleation: n is unexpectedtly high, it increases continuously with the deposited amount θ and shows no temperature dependence. These unusual results indicate the presence of long range repulsive interactions. Kinetic Monte Carlo simulations and DFT calculations support this conclusion.

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