

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Electronic states of graphene grain boundaries** ANDREJ MESAROS, Instituut-Lorentz, Universiteit Leiden, P.O. Box 9506, 2300 RA Leiden, The Netherlands, STEFANOS PAPANIKOLAOU, LASSP, Physics Department, Clark Hall, Cornell University, Ithaca, NY 14853-2501, C.F.J. FLIPSE, Department of Applied Physics, Eindhoven University of Technology, 5600 MB Eindhoven, The Netherlands, DARIUS SADRI, JAN ZAAANEN, Instituut-Lorentz, Universiteit Leiden, P.O. Box 9506, 2300 RA Leiden, The Netherlands — Recent scanning tunneling spectroscopy measurements on graphite grain boundaries have identified zero energy peaks in the local density of states. These features are tied to intriguing magnetic properties observed in such samples, but are not found in existing theoretical models. We therefore study amorphous grain boundaries in graphene, and find stable structures along the boundary, responsible for local density of states enhancements both at zero and finite energies. We also consider the low energy continuum theory of arrays of dislocations forming a grain boundary in graphene. It predicts the appearance of localized zero energy states, pending the atomic scale dislocation core structure. We discuss possible stable dislocation core structures that actually carry such states.

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Date submitted: 30 Dec 2010

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