Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Spin-dependent conductance of small graphene flakes[1] R. TUGRUL SENGER, Department of Physics, Izmir Institute of Technology, Turkey, HASAN SAHIN, UNAM-Institute of Materials Science and Nanotechnology, Bilkent University, Turkey, SALIM CIRACI, Department of Physics, Bilkent University, Turkey — Using *ab initio* density-functional theory and quantum transport calculations based on nonequilibrium Green's function formalism we study structural, electronic, and transport properties of small graphene flakes. Rectangular and triangular graphene flakes are stable, having magnetically ordered edge states. We show that a spin-polarized current can be produced in pure, hydrogenated, rectangular graphene flakes by exploiting the spatially separated edge states of the flake using asymmetric, nonmagnetic contacts (1). Sharp discontinuities in the transmission spectra which arise from Fano resonances of localized states in the flake are also predicted. Functionalization of the graphene flake with magnetic adatoms such as vanadium also leads to spin-polarized currents even with symmetric contacts. Ground state of triangular flakes have non-zero magnetic moments and their conductance are spin polarized.
(1) H. Sahin and R. T. Senger, Phys. Rev. B **78**, 205423 (2008).

[1]Supported by: TÜBİTAK Project No:106T597, TÜBA

Tugrul Senger
Izmir Institute of Technology

Date submitted: 17 Dec 2009 Electronic form version 1.4