

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Magnetoresistive junctions based on epitaxial graphene and h-BN OLEG YAZYEV, ALFREDO PASQUARELLO, Ecole Polytechnique Federale de Lausanne (EPFL), CH-1015 Lausanne, Switzerland — Using a first-principles approach, we investigate the structural, magnetic and transport properties of interfaces based on epitaxially grown monolayer graphene and hexagonal boron nitride (*h*-BN) in combination with ferromagnetic transition metals (Fe, Co and Ni). Such structurally well defined interfaces based on (111) fcc or (0001) hcp transition metals can be produced using simple manufacturing processes. Our calculations predict magnetoresistance ratios over 100% for certain junction compositions. In addition, such systems feature strong antiparallel (Fe and Co) and parallel (Ni) exchange coupling across the interface combined with low junction resistance. The predicted properties position such magnetoresistive junctions as an interesting alternative to the currently used giant and tunneling magnetoresistance systems and make them suitable for practical applications.

Oleg Yazyev
Ecole Polytechnique Federale de Lausanne (EPFL),
CH-1015 Lausanne, Switzerland

Date submitted: 18 Nov 2008

Electronic form version 1.4