

Abstract Submitted  
for the MAR07 Meeting of  
The American Physical Society

**Planar Model of Orbital Paramagnetism in B-DNA and A-DNA at Low Temperatures.** MICHAEL J. HARRISON, Michigan State University — We develop a planar model of B-DNA which exhibits orbital paramagnetic properties at low temperatures arising from a small number of conducting pi electrons that move in a parabolic potential attracting them towards the central axis of the model molecule. The paramagnetism is nonlinear in applied field and can have a maximum several times the magnitude of diamagnetism per particle in an extended 2DES. The model is consistent with recent experimental observations [1] provided that only a small number of itinerant pi band electrons of higher energy are assumed to participate, amounting to only 1% of the total number of pi stack electrons from base pairs which are thought to constitute a hybridized core within the actual double helix. The model indicates that the encladding water molecules attached to wet B-DNA provide dielectric screening of the attractive parabolic potential, and can explain the presence of orbital paramagnetism, which is experimentally absent in dry A-DNA [1]. S. Nakamae, et al, PRL 94, 248102, (2005).

Michael J. Harrison  
Michigan State University

Date submitted: 14 Nov 2006

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