Abstract Submitted
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Theoretical Model for a Carbon Nanotube-Based Magnetometer at Non-Zero Temperatures VLADIMIR DOBROKHOTOV, CHRIS BERVEN, University of Idaho — We present a complete description of electronic current in metallic single-walled carbon nanotubes under the influence of axially oriented magnetic fields at nonzero temperatures. We include in our model [1] the diameter of the carbon nanotube, the temperature and length of the nanotube. We find that the current in a zigzag carbon nanotube that is metallic at zero magnetic field is strongly modulated by varying the magnitude of an axially oriented magnetic field. We use this property, to propose a design of a carbon nanotube based directional magnetometer that could be designed to sense magnetic fields from 1 T to 8 T and at temperatures from 0 K up to 100 K. [1] Vladimir Dobrokhotov and Christopher Berven, "Electronic Transport Properties of Metallic CNTs in an Axial Magnetic Field at nonzero Temperatures: A Model of an Ultra-small Digital Magnetometer," accepted for publication 11-2005 Physica E

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