Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Wetting Behavior of Nitrous Oxide Near its Critical Point ROBERT WEILER, MORDECAI WAEGELL, RAFAEL GARCIA, Worcester Polytechnic Institute — A liquid is said to "not wet" a surface if its beads on it and thus exhibits a nonzero contact angle. However, if the liquid spreads out uniformly on the surface, with a contact angle of zero, then it is said to "wet" the surface. Given any liquid whatsoever that initially does not wet a surface, the Cahn theory [1] predicts that the liquid will eventually wet the surface as we increase the temperature and follow along the liquid-vapor coexistence line. For liquids on solid surfaces, the wetting transition, from non-wetting to wetting, is predicted to be first order and occur sharply at a wetting temperature Tw [2]. Tw can be calculated from our knowledge of interatomic potentials that characterize the adatom-adatom attraction and the adatom-surface attraction. The Cahn theory has been verified for non-polar liquids on solid surfaces but so far there exist no experiments for polar liquids. Nitrous Oxide is polar and has a critical point slightly above room temperature. We will report on initial experiments to verify the Cahn theory for this system. [1] J. W. Cahn, J. Phys. Chem. 66, 3667 (1977). [2] M. Gatica, X. Zhao, J. K. Johnson and M. W. Cole, J. Phys. Chem. B 108, 11704 (2004) and References Therein.

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Date submitted: 12 Jan 2006 Electronic form version 1.4