Abstract Submitted
for the OSS06 Meeting of
The American Physical Society

Transmission and phase behavior of an open Aharonov-Bohm ring with a single quantum dot ERIC HEDIN, YONG JOE, Ball State University, ARKADY SATANIN, Institute for Physics of Microstructures, RAS — The electron transmission and phase, and the AB-oscillation phase of a 3-terminal Aharonov-Bohm (AB) ring with a quantum dot (QD) embedded in one arm are investigated using a tight-binding model. It is shown that in a three-terminal interferometer, the zero of the Fano resonance in the transmission moves off the real energy axis in relation to the degree of coupling of the QD to a third output terminal. A simple analytical model of the Fano resonance shows naturally how the phase transition across the resonance peak will change from an abrupt jump of π to a smooth transition when the Fano zero energy is no longer real, but complex. The Fano zero orbits around the pole as a function of magnetic flux through the ring, and can be returned to the real energy axis at specific values of the flux, as long as the coupling parameter is smaller than a critical value. By tuning the degree of coupling to the third lead, the phase of the AB oscillations can be matched to the intrinsic phase of the QD, providing an experimental method of extracting the phase behavior of the QD. *Supported by the Indiana 21st Century Research and Technology Fund. One of the authors (E. R. H.) is partially supported by a grant from the Center for Energy Research, Education, and Service (CERES), at Ball State University.

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Date submitted: 15 Mar 2006 Electronic form version 1.4