Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Dephasing of an electron Mach-Zehnder interferometer capacitively coupled to a quantum dot SEOK-CHAN YOUN, HEUNG-SUN SIM, Korea Advanced Institute of Science and Technology, HYUN-WOO LEE, Pohang University of Science and Technology — We theoretically investigate an electron Mach-Zehnder interferometer capacitively coupled to a quantum dot. We derive the current and connect its interference behavior to the statistics of the charge fluctuation of the dot. The interference is analyzed in the two limiting cases of fast and slow charge fluctuations: For the case of fast fluctuations where the dwell time of the dot is much smaller than the flight time of the interferometer, the visibility is reduced due to the charge fluctuations, while in the opposite limit the behavior of the interference can be understood by screening effects. The connection to recent experimental and theoretical works will be discussed.

Heung-Sun Sim
Korea Advanced Institute of Science and Technology

Date submitted: 18 Nov 2006 Electronic form version 1.4