Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

A mesoscopic magnetron as an open quantum system TADEUSZ PUDLIK, Physics Department, Boston University, ANTONIO CASTRO NETO, Physics Department, Boston University; Department of Physics, National University of Singapore, DAVID CAMPBELL, Physics Department, Boston University — The emergence of materials with room temperature electron mean free paths of a micron or more opens up new possibilities in the design of solid state devices. One such potential new paradigm are solid state quasi-free electron devices, which promise to combine the wide frequency tunability of classical vacuum tube devices with the small size and low costs of semiconductor technology. As a step towards realistic models of these devices, we develop a quantum mechanical description of a mesoscopic magnetron, in which the vacuum chamber of traditional magnetron is replaced with a semiconductor. We show that the problem can be mapped to a Bose-Hubbard dimer coupled to a dissipative bath and study the effect of the band structure of the medium on device performance.

Tadeusz Pudlik
Physics Department, Boston University

Date submitted: 12 Nov 2014 Electronic form version 1.4