**Escape in the Strong Quantum Regime** ALEJANDRO PUGA,
BRUCE MILLER, Texas Christian University — Physicists have used billiards to
understand and explore both classical and quantum chaos. Recently, in 2001, a
group at the University of Texas introduced an experimental set up for modeling
the wedge billiard geometry called optical billiard in two dimensions. It is worth
mentioning that this experiment is more closely related with classical rather than
quantum chaos. The motivation for the present work was born from the idea of lay-
ing the foundations of a quantum treatment for optical billiards, named "The Escape
Problem", by presenting the concept of a Transparent Boundary Condition (TBC).
Since a four-dimensional phase space is computationally very difficult to investigate,
we will explore a pair of one-dimensional examples. First we will consider a classical
perspective by analyzing a "gas of particles" limited to stay inside a one dimen-
sional box of length L, and finishing with the resolution of a Quantum Initial Value
Problem (QIVP) using a numerical method developed and entirely checked with an
exact, analytic theoretical method. The numerical method introduces a novel way to
solve a Diffusion Type Equation by implementing Discrete Transparent Boundaries
Conditions (DTBCs) recently developed by mathematicians.

Bruce Miller
Texas Christian University