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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 laying 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 dimensional 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.

☐ Prefer Oral Session
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