Generalizing Cross Sections for Non-Asymptotic Measurements
JARED STENSON, Rice University — Scattering theory is a unit of any introductory course on quantum mechanics. A major tool in scattering theory is the measurement of cross sections. Although these are exclusively defined in the asymptotic regime, they are ultimately just a normalized measurement of a dynamical system. This is especially apparent in the non-asymptotic regime of scattering. We model this time-dependent region and extract several key ideas for generalizing the cross section as a general measurement tool. This raises several interesting and fundamental issues involving interference, time-measurements, trajectory formulations of quantum mechanics, and the meaning of the so-called probability current.

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