

# A BALLISTIC MOTION DISRUPTED BY BRAGG REFLECTIONS

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I will discuss a Lindblad dynamics modeling a quantum test particle in a Dirac comb that collides with particles from a background gas. The result is a homogenization theorem in a semi-classical limiting regime involving large mass for the test particle and a rescaling for the strength and period of the Dirac comb. Over the time interval considered, the particle would exhibit essentially ballistic motion if either the singular periodic potential or the kicks from the gas were removed. However, the particle behaves diffusively when both sources of forcing are present. The conversion of the motion from ballistic to diffusive is generated by occasional Bragg reflections that result when the test particle's momentum is driven through a collision near an element of the half-spaced reciprocal lattice of the Dirac comb.