

Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Signature of the s -wave regime high above ultralow temperatures¹

ROBIN CÔTÉ, I. SIMBOTIN, University of Connecticut, Department of Physics — Resonant exchange scattering plays a key role in many-body dynamics and transport phenomena (e.g., spin, charge, or excitation diffusion). We show that the s -wave contribution to the resonant exchange cross section for such processes, generally thought to contribute mainly in the ultracold (or Wigner) regime, dictates the overall cross section over a wide range of energies. We derive a simple analytical expression for the cross section and explain its applicability for energies high above the Wigner regime. We also discuss its relationship to the classical capture (Langevin) cross section, and apply it to three very different resonant processes; namely, resonant charge transfer, spin-flip, and excitation exchange. Our new result explains large variations for different isotopes that cannot otherwise be accounted for by the small change in mass. The s -wave signature also allows to gain information about the Wigner regime from data obtained at much higher temperatures, which is especially advantageous for systems where the ultracold regime is not reachable.

¹This work was partially supported by the National Science Foundation Grant PHY-1806653.

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Date submitted: 31 Jan 2019

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