

Probing the Efimov discrete scaling in atom-molecule collision

The discrete Efimov scaling behavior, well-known in the low-energy spectrum of three-body bound systems for large scattering lengths (unitary limit), is identified in the energy dependence of atom-molecule elastic cross-section in mass imbalanced systems. That happens in the collision of a heavy atom with mass m_H with a weakly-bound dimer formed by the heavy atom and a lighter one with mass $m_L \ll m_H$. Approaching the heavy-light unitary limit the s-wave elastic cross-section σ will present a sequence of zeros/minima at collision energies following closely the Efimov geometrical law. Our results, obtained with Faddeev calculations and supplemented by a Born-Oppenheimer analysis, open a new perspective to detect the discrete scaling behavior from low-energy scattering data, which is timely in view of the ongoing experiments with ultra-cold binary mixtures having strong mass asymmetries, such as Lithium and Caesium or Lithium and Ytterbium.

Summary

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Session Classification: Monday Posters