Contribution ID: **27** Type: **not specified**

Scattering of non-relativistic finite-size particles and puffy dark matter direct detection

Monday, 20 April 2026 14:00 (15 minutes)

In this work we consider the scattering between non-relativistic particles with different finite sizes. We first calculate their interaction potential and apply the partial wave method to obtain their scattering cross section. Our findings show that the particle size can significantly affect the scattering between non-relativistic particles. Then we apply such a study to direct detection of puffy dark matter. We find that the finite size of the target nucleus may introduce non-perturbative effects that differ from the scenario of point-like dark matter. For large-size dark matter particles, this non-perturbative regime in the dark matter–nucleus scattering cross section effectively disappears; while for small values of the size-to-range ratio in the scattering process, a significant non-perturbative regime can maintain. Finally, for the direct detection of nugget-type puffy dark matter with a small number of constituent particles, we find that the stability conditions for the formation of bound-state dark matter can provide constraints on the dark matter–nucleus scattering cross section.

Primary author: 武龙, 许

Presenter: 武龙, 许

Session Classification: Parallel Theory-BSM: BSM Probes (Room 368, Chair Ke-Ping Xie)