

Resonant four-body interaction in cold Rydberg atoms

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Cold Rydberg atoms subject to long-range dipole-dipole interactions represent a particularly interesting system for exploring few-body interactions and probing the transition from 2-body physics to the many-body regime. We will show the direct observation of a resonant 4-body Rydberg interaction, by exploiting the occurrence of an accidental quasi-coincidence of a 2-body and a 4-body resonant Stark-tuned Förster process in cesium. These results are relevant for the implementation of high-fidelity quantum gates with Rydberg atoms for quantum information processing, and for further studies of many-body physics.