A step beyond the Efimov scenario: evidence of a universal four-body state

FRANCESCA FERLAINO, STEVEN KNOOP, MARTIN BERNINGER, WALTER HARM, HANNS-CHRISTOPH NAEGERL, RUDOLF GRIMM, Inst. of Experimental Physics and Center for Quantum Physics, Univ. Innsbruck — Ultracold cesium atoms and Feshbach molecules provide unique model systems to explore universal few-body phenomena. In previous experiments, we have investigated atomic three-body recombination and atom-dimer relaxation in ultracold atomic and molecular samples at large scattering lengths and obtained clear evidence for Efimov three-body states. Here, we report on a step beyond the Efimov scenario by investigating a four-body phenomenon that was recently predicted by von Stecher et al. (arXiv:0810.3876). Our recombination measurements in an atomic sample at negative scattering lengths show a resonant enhancement of losses and provide strong evidence for the existence of the predicted four-body bound states.

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