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Efimov Trimer Production in a Resonantly Interacting BEC XIN XIE, CATHERINE KLAUSS, CARLOS ABADIA, JOSE D'INCAO, JILA, NIST and CU-Boulder, ZORAN HADZIBABIC, Cavendish Laboratory, University of Cambridge, DEBORAH JIN, ERIC CORNELL, JILA, NIST and CU-Boulder, JILA, NIST AND CU-BOULDER TEAM, CAVENDISH LABORATORY, UNIVERSITY OF CAMBRIDGE TEAM — Ultracold quantum gases with resonant interactions have been in focus for decades as an ideal and tunable model of many-body physics. Fermi gases have been widely studied owing to its direct relation to realistic materials. Resonantely interacting Bose gases, however, were first observed only a couple of years ago due to its short lifetime caused by three-body recombination. Such three-body interaction is an intriguing feature of Efimov physics which is absent in the Fermionic counterpart. We previously observed a relatively stable degenerate Bose gas by quenching to unitarity. This state equilibrates many times faster than the gas's lifetime. In this work, we did a closer investigation into this quasi-equilibrium state by projecting it onto weakly interacting regimes and probing it therein. We discovered dramatic signatures of Efimov trimers by measuring their one-body decay time that agrees with theoretical calculations. We propose that such formation of trimers is related to the finite overlap between trimer wavefunctions and short-range correlations in the quenched state. And the study of molecules in their well-characterized states provide a unique pathway to understand the two-body and three-body correlations in resonantly interacting BEC.

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