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Universal Loss Behavior of Trapped Finite-Temperature Unitary Bose Gases ULRICH EISMANN, TOPTICA Photonics AG, Lochhamer Schlag 19, 82166 Graefelfing, Germany, LEV KHAYKOVICH, Department of Physics, Bar-Ilan University, Ramat-Gan, 52900 Israel, SÉBASTIEN LAURENT, IGOR FERRIER-BARBUT, BENNO S. REM, ANDREW T. GRIER, FRÉDÉRIC CHEVY, CHRISTOPHE SALOMON, LKB, ENS-PSL Research University, CNRS, UPMC-Sorbonne Universités, Collège de France, 24 rue Lhomond, 75231 Paris, France, LI-CHUNG HA, CHENG CHIN, James Franck Institute, Enrico Fermi Institute and Department of Physics, University of Chicago, Chicago, IL 60637 USA.
— The low-temperature unitary Bose gas is a fundamental paradigm in few-body and many-body physics, attracting wide theoretical and experimental interest. We give an overview of a theory describing the dynamic interplay of two-body evaporation and three-body recombination in a trapped unitary atomic gas. We identify a magic trap depth where, within some parameter range, evaporative cooling is balanced by the recombination heating such that temperature stays constant. We perform independent experiments with ^{7}Li and ^{133}Cs atoms tuned to Feshbach resonances. These fully support the predictions of the model and enable quantitative measurements of both the trap depth, and the 3-body recombination rate in the low-temperature domain. We verify the validity of the universal dynamics for both species, for 2D and 3D evaporation, over two orders of magnitude in temperature and four orders of magnitude in three-body loss.

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