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Tuning Interactions in Two and Three Dimensions RICHARD FLETCHER, NIR NAVON, MARTIN ROBERT-DE-SAINT-VINCENT, ALEXANDER GAUNT, ROBERT SMITH, ZORAN HADZIBABIC, University of Cambridge — We present recent work on a Bose gas with tuneable interactions in two very different geometries. In three dimensions, we study the stability of a thermal 39K Bose gas across a broad Feshbach resonance, focusing on the unitary regime. We measure the general scaling laws relating the particle-loss and heating rates to the temperature, scattering length, and atom number. As a consequence of species-specific Efimov physics, we find 39K to be particularly promising for studies of many-body physics in a unitary Bose gas. We also present more recent work on a two-dimensional trapping configuration. Such a setup permits investigation of the subtle interplay between interactions and condensation in this regime, in particular the crossover between BEC and BKT physics.

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