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Limits to $T/T_{\rm F}$ and progress towards ultracold ⁶Li-⁸⁷Rb mixtures MICHAEL BROWN-HAYES, QUN WEI, WOO-JOONG KIM, Dartmouth College, CARLO PRESILLA, University of Rome "La Sapienza" and INFM-CNR, ROBERTO ONOFRIO, Darmouth College and University of Padua — Ultracold dilute atomic gases are providing a new window into quantum physics, with particular regard to the first-principle study of superfluid phenomena. Fermionic degeneracy (measured by $T/T_{\rm F}$) achieved with current apparata using sympathetic cooling techniques seems to be limited by the heat capacity matching between the Fermi and Bose species and by Fermi-hole heating. We will discuss these factors and report on the development of an apparatus for simultaneous trapping and cooling of ⁶Li and ⁸⁷Rb, using a light-assisted magnetic trap. ¹ The ⁶Li and ⁸⁷Rb species combination, in conjunction with the improvement in heat capacity matching, should allow for an improved lower limit to attainable temperatures in Fermi-Bose mixtures. ² We also report on seemingly opposite approaches to reaching a lower T/T_F and suggest the differences are due to two distinct measures of cooling efficiency.

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