

Effects of interactions on Bose-Einstein condensation of an atomic gas

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I will discuss our recent measurements of various effects of interactions on the condensation of a trapped atomic gas. First, we experimentally scrutinized the concept of purely statistical saturation of the thermal component as the driving mechanism for condensation [1]. We show that under usual experimental conditions weakly interacting trapped atomic gases actually show strong deviation from the textbook saturation picture, but saturation is recovered in the limit of vanishing interactions. Second, we experimentally observed for the first time the long-sought beyond-mean-field interaction shift of the critical temperature of a trapped gas [2], and related our measurements to the universal results obtained by Monte-Carlo calculations for a uniform system [3]. Finally, I will present very recent measurements of non-equilibrium condensation dynamics following a quench of the interaction strength.

[1] N. Tammuz et al., PRL 106, 230401 (2011).

[2] R. P. Smith et al., PRL 106, 250403 (2011).

[3] R. P. Smith et al., arXiv:1106.6295 (2011).