

Splitting a condensate on an atom chip: effect of temperature and interactions

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Abstract

We measure atom number statistics after splitting a gas of $N \sim 1000$ ultracold ^{87}Rb atoms in a purely magnetic double-well potential on an atom chip. Well below the critical temperature T_c , we observe reduced fluctuations down to -4.9 dB below the shot-noise level. Fluctuations rise to more than +3.8 dB close to T_c , before reaching the shot-noise level for higher temperatures. We use two-mode and classical field simulations to model these results. This allows us to confirm that the super-poissonian fluctuations directly originate from quantum statistics.