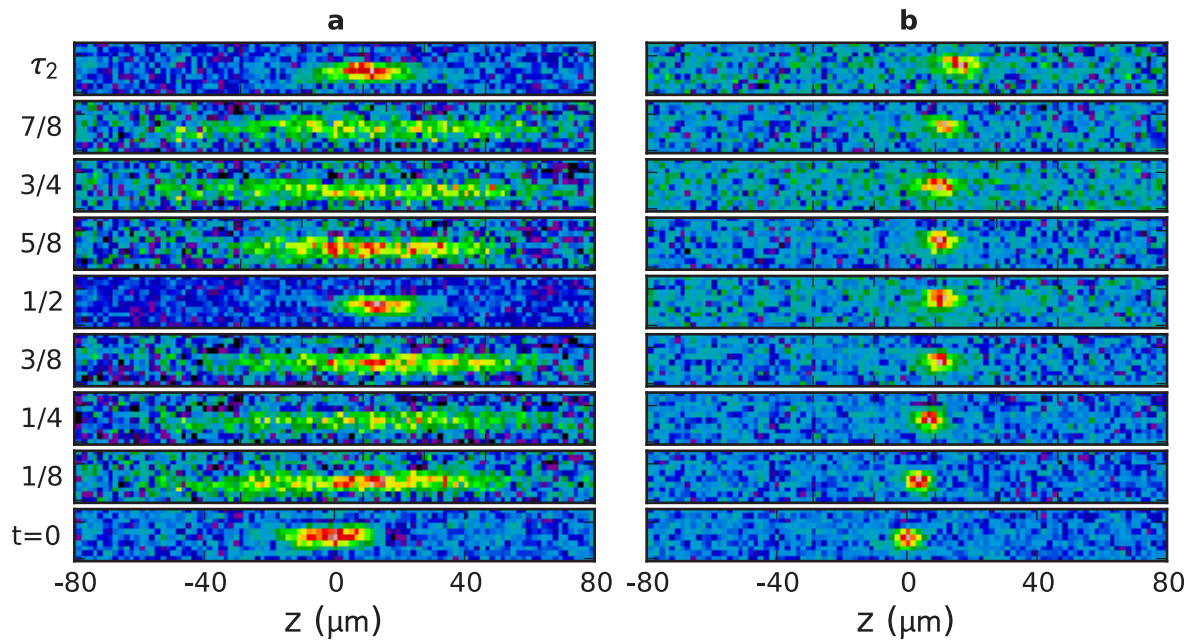


Collisions of matter-wave solitons



Supplementary Figure 1: **Comparison between the expansion of a soliton and a repulsive condensate.** **a**, A condensate with repulsive interactions is formed with $N/N_c = +0.55$, and suddenly transferred into a single-beam trap by turning off the beam perpendicular to the magnetic field axis. The new axial trap frequency is $\omega_{z2} = 8$ Hz ($\tau_2 = 125$ ms). Images are taken at intervals of $\tau_2/8$. The condensate rapidly expands as a result of the repulsive interactions between atoms. The subsequent reformation of the condensate at $\tau_2/2$ and at τ_2 indicates that a breathing mode has been excited. **b**, Similar to **a**, but with $N/N_c = -0.53$. Here, the soliton propagates without dispersion, as expected. The small displacement in time is due to a slight time-dependent displacement between trap centres. Note that the color mappings of Supplementary Figs. 1a and 1b differ to account for differences in density.