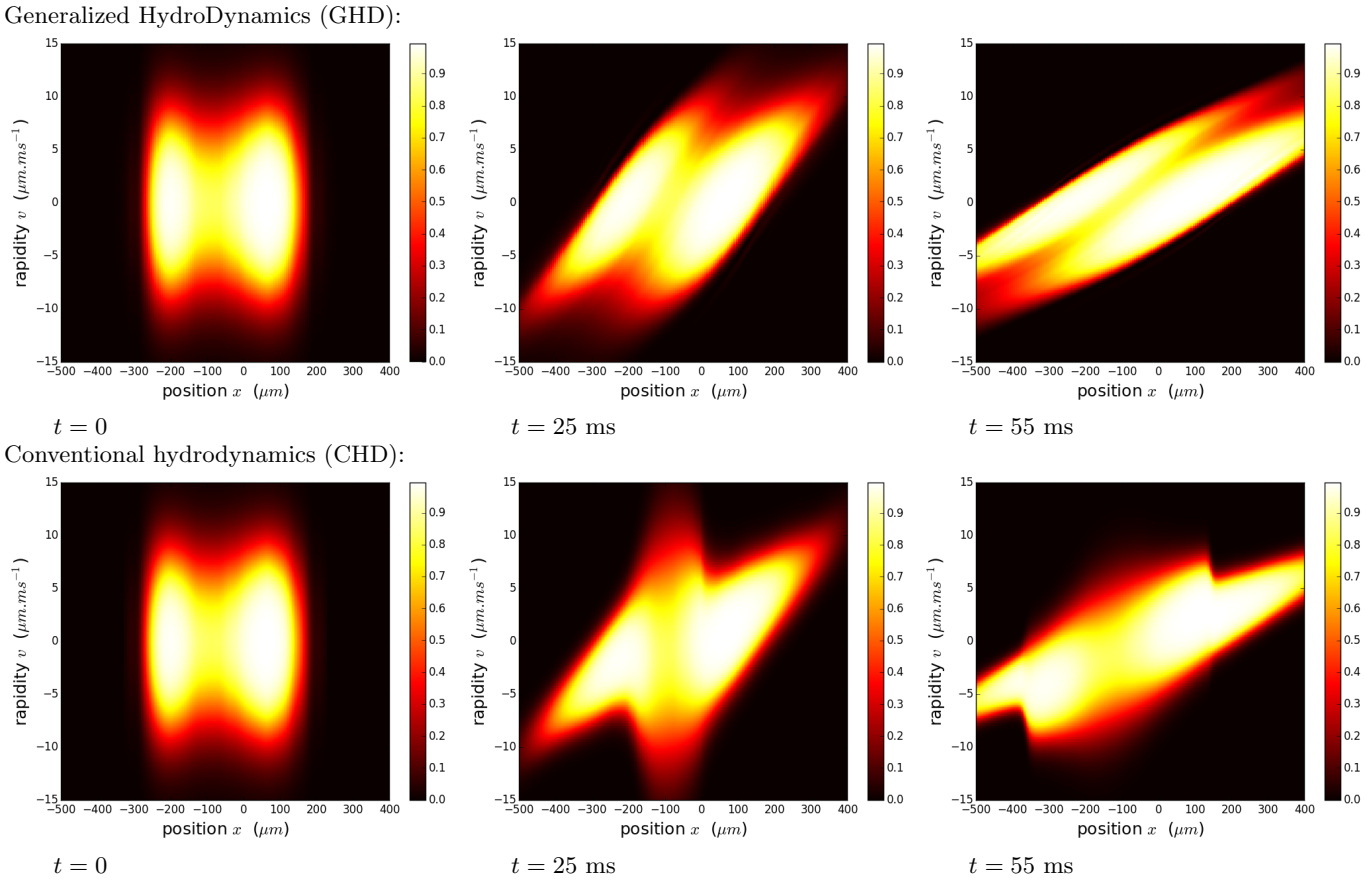

FIG. 2. Phase-space occupation $\nu(x, v)$ at time t for the parameters of Fig. 3 in the main text, simulated with GHD and CHD. Since CHD does not allow non-thermal local distributions of rapidities, we see that the distribution gets quickly distorted, compared to the GHD one. This results in the two in situ density profiles being clearly different, see Fig. 3 in the main text.

V. GROSS PITAEVSKII PREDICTIONS FOR EXPANSION FROM A DOUBLE WELL

We performed a Gross Pitaevskii calculation for the situation considered in Fig.3. In this calculation, the initial wavefunction is $\psi(x) = \sqrt{n_0(x)}$, where $n_0(x)$ is the initial experimental profile. We then evolve this initial profile according to the time-dependant Gross-Pitaevskii equation Eq. (8). The resulting time evolution, shown in Fig.(3), is very different from that observed experimentally. This indicates that thermal excitations initially present in the cloud play an important role in the time-evolution shown in Fig.3. Note that GHD calculations performed at a very low temperature are in agreement with these Gross-Pitaevskii calculations, provided fast oscillations shown in the Gross-Pitaevski profiles are averages out (see section VI).