Abstract Submitted
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Enabling Chip-Based Atom Interferometry 1: Long Coherence Time and Number Squeezing with ^{23}Na BECs C.A. CHRISTENSEN, G.-B. JO, Y. SHIN, S. WILL, T.A. PASQUINI, M. SABA, W. KETTERLE, D.E. PRITCHARD, MIT — Using a combination of DC and RF magnetic fields, we have coherently split a BEC into two separated BECs on an atom chip. We find that the split BECs maintain a relative phase coherently for up to 200 ms, which we read out using absorption imaging of matter wave interference after time-of-flight expansion. This is a factor of 10 longer than the phase diffusion time for a coherent state at our atom number and density. We attribute the long coherence time to number squeezing by a factor of 10 caused by mean-field interactions during the splitting process, which reduces the phase diffusion rate. In spite of the presence of strong atom-atom interactions, the system potentially allows us to implement a BEC interferometer on an atom chip. G. –B. Jo et al., PRL 98, 030407 (2007)

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