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**Beamsplitting of a Bose-Einstein Condensate in a Microtrap by a Standing Light Wave** QUENTIN DIOT, STEPHEN SEGAL, DANA ANDERSON, ERIC CORNELL, JILA, MARA PRENTISS COLLABORATION, VICTOR BRIGHT COLLABORATION — We have developed an in-guide atom beamsplitter and demonstrated the coherent nature of the process by observing interference between the split wavepackets. Pre-cooled atoms are captured by the on-chip waveguide and trapped by confining fields in a "microtrap" region of the guide. Atoms are then evaporatively cooled to form a Bose-Einstein condensate. Finally, we are able to split the condensate, propagate two wavepackets in opposite directions along the waveguide and read their relative phase by exposing the trapped BEC to a sequence of standing light pulses. We carefully aligned the standing light field with the waveguide by directly mounting mirrors on the chip substrate. Pre-cooled atoms reach the trapping region by following the guide through a 180-um-height tunnel under one of the mirrors. We control the phase shift between the two wavepackets by applying an external magnetic gradient parallel to the guide. After recombining the clouds, we observed coherence signals for up to 10 ms of propagation time. The in-guide production of a condensate, the numerous wires and features available on the chip and the proven coherence of the beamsplitter, make this device a useful tool for understanding and improving the propagation of coherent atomic samples in waveguides.

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