A Bose-Einstein Condensate in an optical ring-shaped trap

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Abstract:

We report on the creation of a Bose-Einstein condensate of sodium atoms in an optical, ring-shaped trap. The all optical potential enables trapping of all spin states of the atoms and circumvents the thermal drift problem that limited the lifetime of persistent currents in our previous ring-shaped trap formed by the combination of magnetic and optical fields [1]. The ring geometry trap opens up new possibilities for studies of nonlinear phenomena, such as soliton dynamics the atomic analog of a SQUID. The latter can be realized by introducing a thin, repulsive sheet-of-light across the ring to act as a Josephson like tunnel barrier [2]. Progress towards this goal will also be discussed.

References:

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2. S. Levy, E. Lahoud, I. Shomroni and J. Steinhauer, Nature 449, 579 (2007).