

Manipulation of a Bose-Einstein condensate by a time-averaged orbiting potential using phase jumps of the rotating field

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We report on the manipulation of the center-of-mass motion ('sloshing') of a Bose Einstein condensate in a time-averaged orbiting potential (TOP) trap. We start with a condensate at rest in the center of a static trapping potential. When suddenly replacing the static trap with a TOP trap centered about the same position, the condensate starts to slosh with an amplitude much larger than the TOP micromotion. We show, both theoretically and experimentally, that the direction of sloshing is related to the initial phase of the rotating magnetic field of the TOP. We show further that the sloshing can be quenched by applying a carefully timed and sized jump in the phase of the rotating field.