

Original Paper

Measurement of Temperature of Atomic Cloud Using Time-of-Flight Technique

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Abstract

We present a discussion on the time-of-flight (TOF) technique for measuring temperature of cold atom clouds, with specific focus on fountain experiments. In these experiments, there exists a possibility of losing substantial number of atoms owing to the interaction of the cloud with the wall of the cavity, in case the dimension of the former exceeds the latter. Hence, we propose to include the contribution of the location and geometry of the cavity in the TOF method which otherwise, generally relies on the cloud shape and the geometry of the probe beams only. A theoretical analysis is presented and it is substantiated with experimental results for cloud temperatures of $<10 \mu\text{K}$ and toss heights of up to 72 cm.

Keywords

Cold atoms – Temperature measurement – Time-of-flight