

Abstract Submitted
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Measuring the fine structure constant with Bragg diffraction and Bloch oscillations CHENGHUI YU, Univ of California - Berkeley — We have demonstrated a new scheme for atom interferometry based on large-momentum transfer Bragg beam splitters and Bloch oscillations. In this new scheme, we have achieved a resolution of $\delta\alpha/\alpha = 0.25ppb/\sqrt{(25h/\tau)}$ in the fine structure constant measurement, which gives up to 4.4 million radians of phase difference between freely evolving matter waves. We have also suppressed our major phase shift caused by Bragg diffraction by more than 1000-fold, as well as other systematic errors, including the Zeeman effect phase shift, which are known in similar atom interferometer experiments.

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