

On the way to a demonstration of a T-cubed atom interferometer

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In this talk, I will discuss a novel atom interferometer with phase that scales as T cubed, where T is the time between the light pulses that form the atom optics of the interferometer. Implementation of this interferometer requires that the atoms move in a linear potential, which we create using an appropriately tailored magnetic field. The magnetic field is imaged using Raman spectroscopy and details of the techniques to make the field will be discussed. I will next discuss our techniques to measure Raman and Ramsey spectra in a magnetic field with a gradient, which includes applying a chirp to the laser system providing the Raman fields. The spectra are produced and displayed as 2D images and the analysis requires some de-skewing of our data. Our preliminary measurements on a full atom interferometer showed oscillations that indeed scaled as T-cubed, but subsequent measurements showed that the oscillations may not be the effect we seek. The talk will end with a mystery.