

Abstract Submitted  
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**Atomic Test of the Equivalence Principle in a 10-meter Tower**  
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University — We aim to explore and expand the limits of atom interferometry in a  
10-meter tower at Stanford University. Atom interferometry uses the coherent split-  
ting and recombination of atoms to make precision measurements of environmental  
parameters such as gravity, acceleration, or magnetic field. The apparatus has been  
designed to test Einstein's Equivalence Principle to a precision of  $10^{-15}g$  by simul-  
taneously launching ultracold atoms of different mass (specifically  $^{85}\text{Rb}$  and  $^{87}\text{Rb}$ )  
and accurately observing their free-fall motion in a vacuum chamber. Although  
we will perform the measurements with low-density clouds of cold atoms, we have  
demonstrated our ability to cool the atoms by forming Bose-Einstein condensates  
of  $^{87}\text{Rb}$ . Cold, dilute clouds can be launched with an optical lattice into the inter-  
ferometer region. Splitting the atoms with Bragg pulses allows for the creation of a  
Mach-Zehnder interferometer for the Equivalence Principle measurement.

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