

Abstract Submitted
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Matter-Wave Interferometry at BYU¹ CHRISTOPHER ERICKSON, JAMES ARCHIBALD, JEREMEY BIRRELL, DAN CHRISTENSEN, MARSHALL VAN ZIJLL, DALLIN DURFEE, Brigham Young University — We report on the progress of two matter-wave interferometers at BYU. The first device is a thermal-beam Ramsey-Bordé calcium interferometer. This device will be used to improve long-term stability of atom-interferometer inertial force sensors and optical frequency standards, and for measurements of relativistic effects in extremely non-relativistic limits. In the future this device will be upgraded to a dual species Ca/Sr interferometer for measurements of time-varying constants. The second device is an ion interferometer based on a laser-cooled $^{87}\text{Sr}^+$ beam which will be split and recombined using stimulated Raman transitions. The ion interferometer will be used to test Coulomb's inverse-square law and the possibility of a finite photon rest mass. We will also present several pieces of precision instrumentation developed for these experiments.

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