Contribution ID: **18** Type: **Poster**

Junjie Jiang

Thursday 4 April 2024 16:50 (2 hours)

As a fundamental assumption of general relativity, the test of the equivalence principle plays a key role in exploring the applicability of the physical framework and seeking new physics. In 2015, we developed the four-wave double-diffraction Raman transition (4WDR) method and tested the equivalence principle for 85Rb-87Rb [1], and in 2021 further expanded to the joint mass and energy test of the equivalence principle [2]. Recently, using the phase shear readout method, we achieved an atom interferometry with free evolution time of 2T=2.6 s for 87Rb atoms, which is the longest in a laboratory setting so far, and the gravity measurement resolution of a single shot is 4.5×10-11 g [3]. On this basis, we have improved cold atomic fountain and Raman lasers to achieve a dual-species atom interferometry with T=650 ms, enhancing the differential measurement resolution to 8.6×10-12. Other unit technology improvement includes the realization of the preparation of dual-species ultra-cold atomic ensembles, and proposed a method that simultaneously coincides the centroid position and velocity of the dual-species atomic ensembles using atomic lensing technology [4]. About phase shear readout, we proposed a method to extract absolute phase and suppress position drift noise [5], these advances have laid the found ation for higher precision test of the equivalence principle.

Session Classification: Poster Session & Wine & Coffee