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Test of the equivalence principle using dual species atom interferometry PETER ASENBAUM, CHRIS OVERSTREET, TIM KOVACHY, Stanford University, DANIEL BROWN, University of Birmingham, JASON HOGAN, MARK KASEVICH, Stanford University — Freely falling atoms are ideal test masses to probe gravitational interactions. Light-pulse interferometry allows one to study the motion of the atoms in respect to the laser beams, which act as rulers for the atomic position. We measure the differential acceleration of two atomic species simultaneously to test the weak equivalence principle. Long interferometer times and large momentum transfer techniques [1, 2] are crucial to improve the precision of this fundamental test. [1] T. Kovachy, P. Asenbaum, C. Overstreet, C. A. Donnelly, S. M. Dickerson, A. Sugarbaker, J. M. Hogan and M. A. Kasevich, Quantum superposition at the half-metre scale, Nature 528, 530–533 (2015) [2] P. Asenbaum, C. Overstreet, T. Kovachy, D.D. Brown, J. M. Hogan, and M. A. Kasevich, Phase shift in atom interferometry due to spacetime curvature, arXiv:1610.03832 (2016)

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