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A new torsion balance for direct tests of the Universality of Free Fall. KASEY WAGONER, Washington University in St. Louis, AMIT SIRCAR, Institute for Plasma Research, Gandhinagar India, RAMANATH COWSIK, Washington University in St. Louis — The principle of equivalence between passive gravitational and inertial mass is a corner stone of General Relativity (GR) and thus is of great interest to anyone wishing compare GR to alternative gravitational theories. We present a new instrument, in the form of a highly sensitive torsion balance, for a direct test of this equivalence. The balance which has a natural frequency of $\nu_0 \sim 1.6 \times 10^{-4}$ Hz is viewed by an autocollimating optical lever with large dynamic range and high resolution. Based on the design of this balance we should be able to probe the universality of free fall more sensitively than the earlier experiments with about one year of data acquisition. Design and construction of all of the pieces comprising the balance are finished and final assembly is in progress. In addition to design aspects we report on the progress towards a complete instrument.

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