

Abstract Submitted
for the APR15 Meeting of
The American Physical Society

Construction of a new watt balance with the goal to realize the kilogram in the US STEPHAN SCHLAMMINGER, DARINE HADDAD, FRANK SEIFERT, LEON CHAO, DAVID NEWELL, JON PRATT, NIST - Natl Inst of Stds & Tech — A watt balance is a mechanical device that compares mechanical power to electrical power. Since electrical power is measured using quantum physics by employing the Josephson effect and the Quantum Hall effect, electrical power can be measured as a product of a known factor, two frequencies, and the Planck constant h . Mechanical power is given by mgv , where m is the mass of a weight, g the local acceleration, and v the velocity. Hence, the watt balance provides a link between mass and Planck's constant. Currently several watt balances worldwide are employed to measure h . A redefinition of the international system of units (SI) is currently in discussion and may become reality as early as 2018. In the new SI, the numerical value of the Planck constant will be fixed and the watt balance is a means to realize the unit of mass. Researchers at NIST are preparing for a new SI and we have started in 2011 with plans to design a new watt balance capable of realizing the kilogram with relative uncertainties of a few parts in 10^8 . Construction of the new watt balance has started in 2014. In my talk, I will show some of the latest results achieved with this apparatus.

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Date submitted: 22 Dec 2014

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