Status report on the measurement of the Planck constant using the NIST-3 watt balance

STEPHAN SCHLAMMINGER, DARINE HADDAD, RUIMIN LIU, DAVID NEWELL, JON PRATT, National Institute of Standards and Technology — The watt balance allows the comparison of virtual mechanical power to virtual electrical power with uncertainties of a few parts in $10^8$. Since electrical power can be determined as the product of known numerical values, two frequencies, and the Planck constant by the virtue of modern quantum metrology, the watt balance is a link between mechanical power and the Planck constant, $h$. The NIST-3 watt balance was used in a 2007 measurement to determine $h$ with a relative uncertainty of $3.6 \times 10^{-8}$. We have recently started efforts for another high precision determination of $h$ with this instrument. We present the status of the effort, discuss the largest contributions to the uncertainty budget, and share our plans for the future.

Stephan Schlamminger
NIST

Date submitted: 21 Dec 2011