Newtonian constant of gravitation workshop at NIST

Friday, October 10, 2014
Laboratory Tours 2:40 pm – 5:00 pm

At the conclusion of the conference, we will break into three groups and walk over to the NIST Advanced Measurement Laboratory for tours of the following facilities:

(A) **The sodium ring Bose Einstein Condensate lab**. Inside this lab, we form Bose-Einstein condensates of sodium atoms that are shaped into rings and study persistent flow around these rings. During the tour, hosted by NIST Associate Stephen Eckel, visitors will see the apparatus, lasers, and a cloud of cold sodium atoms contained in a magneto-optical trap (Building 216 room E116).

(B) **The small mass and force lab**. Inside this lab, we extend SI traceability to atomic scale force measurements by furthering methods of realizing the unit of mass and force from intrinsic quantum standards. During the tour, hosted by NIST chemist Gordon Shaw, visitors will get an overview of the project activities, then move on to the lab to see the NIST Electrostatic Force Balance (EFB), which is being used to measure the mass of milligrams with ppm-level uncertainties, and new precision oscillators used to measure SI-traceable femtonewton forces (Building 219 room B0010).

(C) **The NIST-4 watt balance lab**. Inside this lab, we will balance electrical and mechanical power to make accurate measurements of the Planck constant in terms of the present SI definition of mass, the International Prototype of the kilogram. During the tour, hosted by NIST physicist Stephan Schlamminger, visitors will see the instrument under construction and learn how mass can be linked to the Planck constant using intrinsic quantum electrical standards, and how ultimately a reciprocal version of the experiment will be used as the realization of the US national standard of mass (Building 218 room E022).