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Is it plasma or Drude? Experimental answer using rotating engineered samples RICARDO DECCA, Indiana Univ-Purdue Univ Indianapolis — Measurements done between a Ni covered sphere and a Au coated rotating sample made of sectors of Au and Ni are presented. This approach follows the proposal made by G. Bimonte.[1] Many samples with different thicknesses t of the top Au film ($t \in [20, 84]$ nm) were prepared to measure the interaction. The Ni-coated sapphire sphere was mounted on a sensitive mechanical torsional oscillator. Measurements were done for separations between the sphere and the Au-coated engineered sample in the {200–1000} nm range. With integration times ~ 1000 s and after accounting for a systematic, once-per-revolution impulsive signal from the air-bearing spindle, the error in the measurement is ~ 0.3 fN. In all cases it was observed that a plasma-like model provides good agreement with the experiment, while the Drude model is off by factors as large as 1000. The experimental apparatus and the potential source of errors will be briefly discussed.

[1]G. Bimonte, Phys. Rev. Lett. 112, 240401 (2014).

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