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Precise measurement of surface plasmon forces at a metal-dielectric interface using a calibrated evanescent wave LULU LIU, ALEX WOOLF, Harvard University — By observing the motion of an optically trapped microscopic colloid, sub-piconewton static and dynamical forces have been measured using a technique called photonic force microscopy. This technique, though potentially powerful, has in the past struggled to make precise measurements in the vicinity of a reflective or metallic interface, due to distortions of the optical field. We introduce a new in-situ, contact-free calibration method for particle tracking using an evanescent wave, and demonstrate its expanded capability by the precise measurement of forces of interaction between a single colloid and the optical field generated by a propagating surface plasmon polariton on gold.

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