Controlled single-particle light scattering measurement

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We present a newly developed scatterometer instrument, which enables accurate multi-wavelength measurements of single-particle samples whose position and orientation are controlled by ultrasonic levitation. We detail the design and calibration process of the instrument. As a preview of its function, a set of light scattering data was measured from a mm-sized extraterrestrial rock sample. The measurements demonstrate a non-destructive approach to derive optical properties of small mineral samples. This enables research on valuable materials, such as those returned from space missions or rare meteorites.