

The standardization of the calibration of atomic force microscope cantilevers through an internet-based initiative

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Abstract

Atomic force microscope (AFM) users often determine the spring constants of cantilevers using functionality built into individual instruments. This calibration is performed without reference to a global standard which limits the comparison of force measurements reported by different laboratories around the world. Here, we describe an internet-based initiative whereby users from all laboratories can instantly and quantitatively compare their calibration measurements to those of others, thereby standardising AFM force measurements, and simultaneously enabling non-invasive calibration of AFM cantilevers of any plan-view geometry. This global calibration initiative (GCI) requires no additional instrumentation or data processing on the part of the user. It utilises a single website where users upload currently available data. A proof-of-principle demonstration of this initiative is presented using measured data from five independent laboratories across three countries, which also allows for an assessment of current calibration.