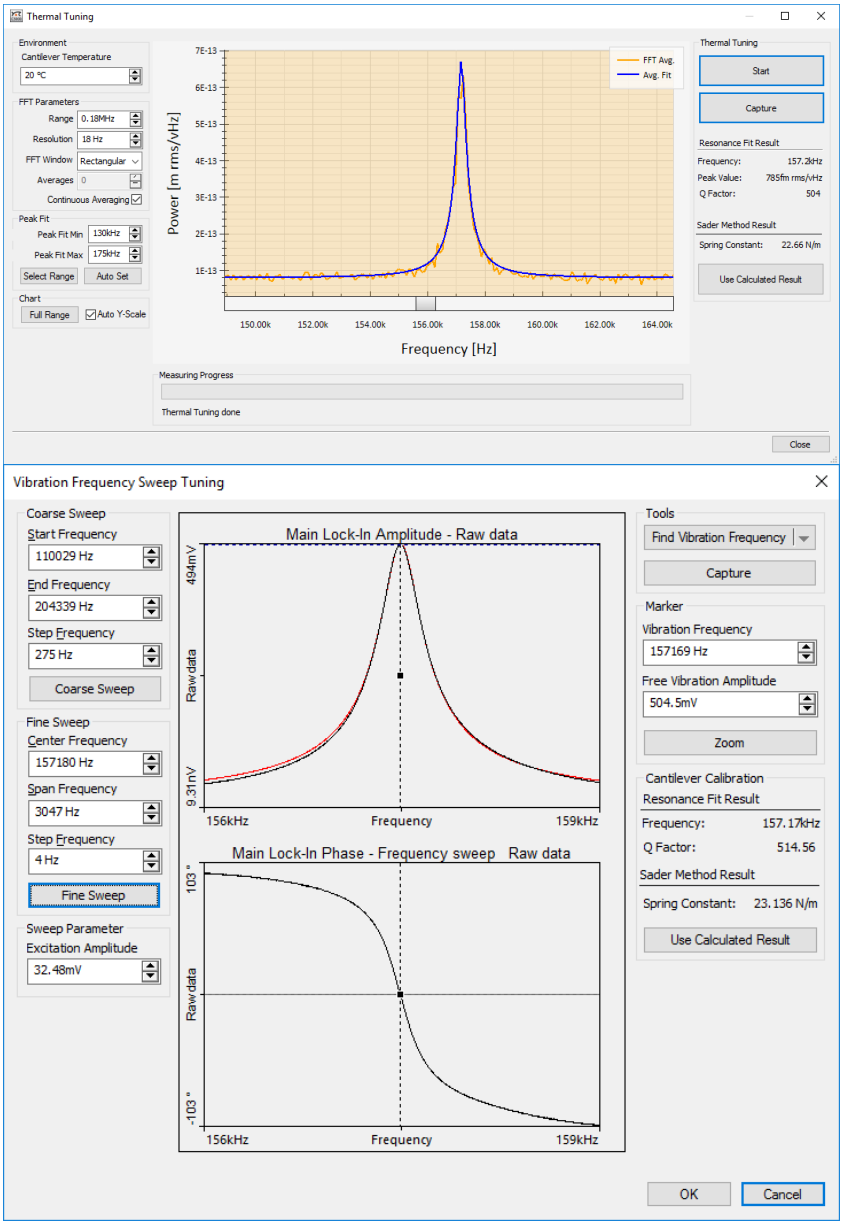
Spring constant determination by frequency sweep and thermal tuning

TN01093

Modern atomic force microscopy (AFM) not only reveals structures and dimensions down to the picometer scale, it also enables scientists to determine mechanical parameters such as elasticity or adhesion. Nanoindentation or force spectroscopy more generally depend heavily on the characterization of the used probe or tip.



Comparison of the automatic stiffness determination from a thermal tune spectrum (top) and newly from a frequency sweep (bottom) using the same TAP190AL-G cantilever. Values differ only marginally and show good reproducibility.

The spring constant of the cantilever and deflection sensitivity of the system are important parameters to perform quantitative force spectroscopy. So far, Nanosurf Software used the Sader method (Rev. Sci. Instrum. 70 (3967) 1999) to determine the spring constant from a thermal tune spectrum (top figure).

Now, we are pleased to introduce a new calibration option in the frequency sweep window from Software Version 3.7.3. determining resonance peak, *Q*-factor, and cantilever stiffness *k* in one click with visual feedback on fitting quality. Comparison of the two evaluation methods shows only minor differences in *k* found by the two methods.

With this option, force spectroscopy becomes more quantitative for NaioAFM as well as Easyscan 2 and SPM S product lines if dynamic mode option is present.

Nanosurf AG
Switzerland

Nanosurf GmbH
Germany

Nanosurf Inc.
USA

Nanosurf 中国中心
China