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Ultrafast spectroscopy at the nanoscale using photo-induced force microscopy. BONGSU KIM, RYAN KHAN, Univ of California - Irvine, SUNG PARK, Molecular Vista - San Jose, ERIC POTMA, Univ of California - Irvine, MOLECULAR VISTA - SAN JOSE TEAM, UNIV OF CALIFORNIA - IRVINE TEAM — Photo-induced force microscopy (PiFM) is an emerging nano-imaging method based on detecting the photo-induced force between the sample and a sharp atomic tip. Because the photo-induced force is a local and near-field effect, this technique enables imaging with a very high spatial resolution, down to 5 nm at ambient conditions. When combined with ultrafast illumination, PiFM makes it possible to examine the nonlinear optical properties of materials at the nanoscale. In this contribution, we present the latest advances in ultrafast spectroscopy with PiFM. We will discuss ultrafast pump-probe measurements as well as highlight experiments in which femtosecond stimulated Raman transitions are detected with PiFM.

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