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Scanning thermal microscopy with a fluorescent nanoprobe BENJAMIN SAMSON, ELIKA SAIDI, LIONEL AIGOUY, LPEM / CNRS, PETER LOW, LAAS / CNRS, BEOMJOON KIM, University of Tokyo, Japan, CHRISTIAN BERGAUD, LAAS /CNRS, MICHEL MORTIER, ENSCP / CNRS, LABORATOIRE PHOTONS ET MATIERE TEAM, LABORATOIRE D'ARCHITECTURE ET D'ANALYSE DES SYSTEMES TEAM, INSTITUTE OF INDUSTRIAL SCIENCE, CENTER FOR INTERNATIONAL RESEARCH ON MICROMECHATRONICS TEAM, LABORATOIRE DE CHIMIE DE LA MATIÈRE CONDENSÉE DE PARIS TEAM — We have developed a scanning thermal microscope that uses a fluorescent particle settled at the extremity of an atomic force microscope tip as a nanoscale temperature sensor. When a temperature change occurs, a modification of fluorescence is detectable, enabling to perform thermal images and to determine the local temperature. We will describe the technique in details and present some thermal images on submicron sized nickel nanoheaters heated by an electrical current. We will show that this apparatus works in both DC and AC regimes, in a low frequency range whose upper limit is around the kilohertz. By performing tip approach/retraction curves on a heated wire, we will describe the different thermal transfer mechanisms between the surface and the fluorescent probe.

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