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Variable frequency characterization of interaction at nanoscale in linear dynamic AFM SIMON CARPENTIER, Université Grenoble Alpes, Institut NEEL, F-38000 Grenoble, France and CNRS Institut NEEL, F-38042 Grenoble, France, MARIO S. RODRIGUES, Departamento de Física da Faculdade de Ciências da Universidade de Lisboa Campo Grande, Edifício C8, JOËL CHEVRIER, Université Grenoble Alpes, Institut NEEL, F-38000 Grenoble, France and CNRS Institut NEEL, F-38042 Grenoble, France — Using electrostatic coupling between an AFM tip and a metallic surface as a test interaction, we shall present the measurement of the force between the tip and the surface, together with the measurement of the interaction stiffness and the associated dissipation. These three quantities constitute a full characterization of the interaction at nanoscale. They are measured independently, simultaneously and quantitatively at the same place. This is made possible thanks to a force feedback method that ensures the DC immobility of the tip and to the simultaneous application of a sub-nanometer oscillation to the tip. In this established linear regime, stiffness and damping are directly obtained from amplitude and phase change measurements. We shall demonstrate that this method is not restricted to the lever resonance frequency. To the contrary, this interaction characterization whose can be used at any frequencies with essentially the same performances. We believe that simultaneous and independent measurements of force, stiffness and damping, out of lever resonance, at nanoscale, and within the context of linear response define a new AFM paradigm that we call Force Feedback Microscopy (FFM).

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