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Formation of a One-Atom Contact on Pb: Adhesion and Energy Dissipation GIOVANNI SAENZ-ARCE, LT-NanoLab, Dep. Fisica Aplicada, Universidad de Alicante. E-03690 Alicante, Spain., GABINO RUBIO-BOLLINGER, Dep. Fisica de la Materia Condensada (C-III), Universidad Autonoma de Madrid, 28049 Madrid, Spain., CARLOS UNTIEDT, LT-NanoLab, Dep. Fisica Aplicada, Universidad de Alicante, E-03690 Alicante, Spain. — Quartz Tuning Fork (TF) has been recently successfully implemented in force detection schemes for scanning probe microscopy applications [1]. Here we report its use as a nanotribometer for studying energy dissipation and the forces in the formation of a single atom contact. The idea behind such a noncontact mono-atomic energy dissipation detector, is to take advantage of the mechanical resonance of a TF which has a large Q-factor ($Q_{4.2K} \sim 150000$) which in our set-up is a function of the tip-sample dissipative forces. Finally, we report measurements of the shift in the resonance frequency and the Q-factor degradation of the oscillating TF, either as a function of the tip-sample voltage or distance. These experiments have been done on Pb close to the superconducting transition temperature in high vacuum.

[1] S. Morita, *et. al. Noncontact Atomic Force Microscopy*, Nanoscience and Technology (Springer-Verlag, Berlin 2002)

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