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PP00P2_176866

Room Temperature STM/AFM for Surface Science Studies

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1. Construction of RT-STM/AFM

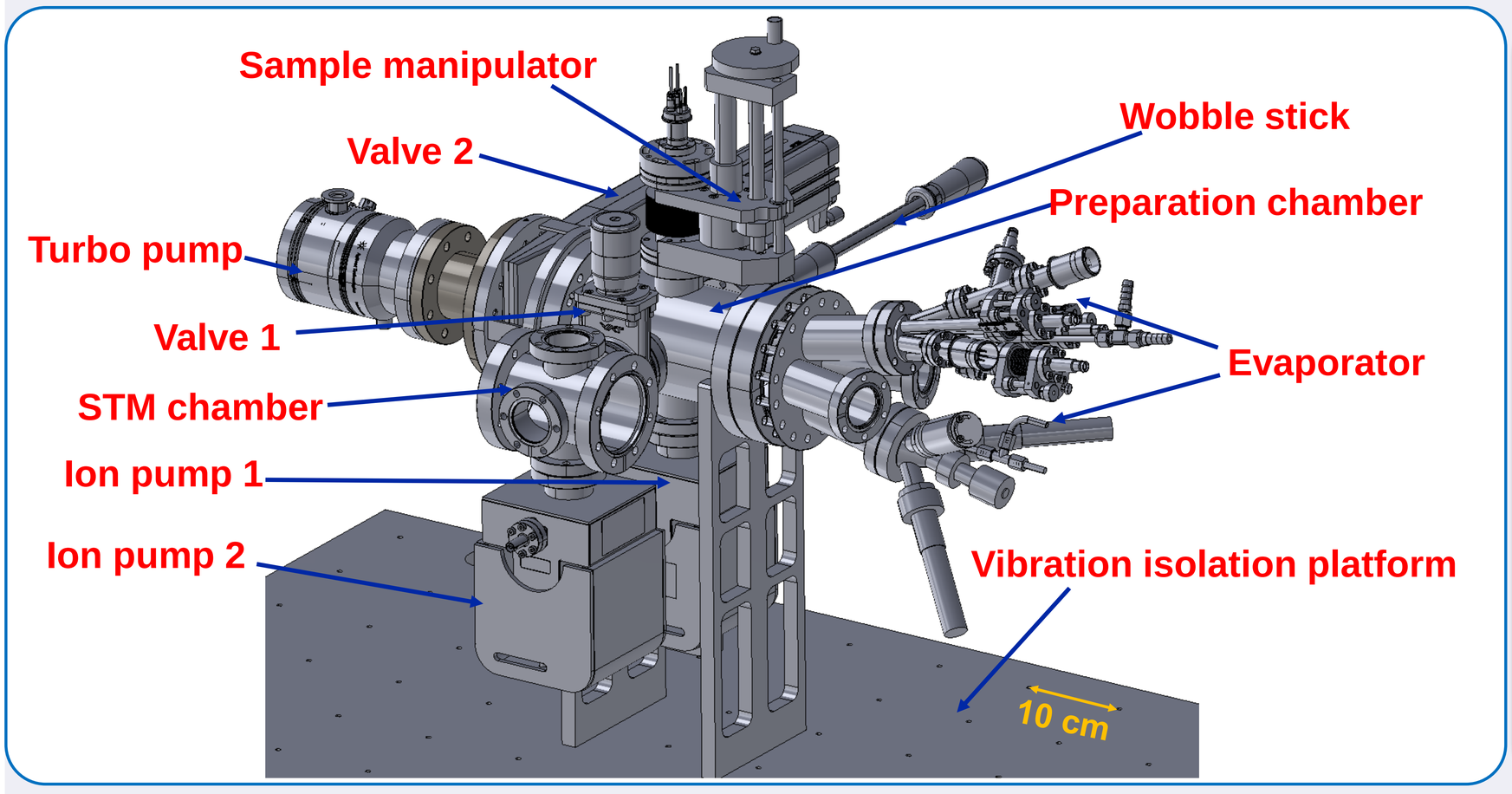


Fig.1: Solidworks drawing of RT-STM construction plan

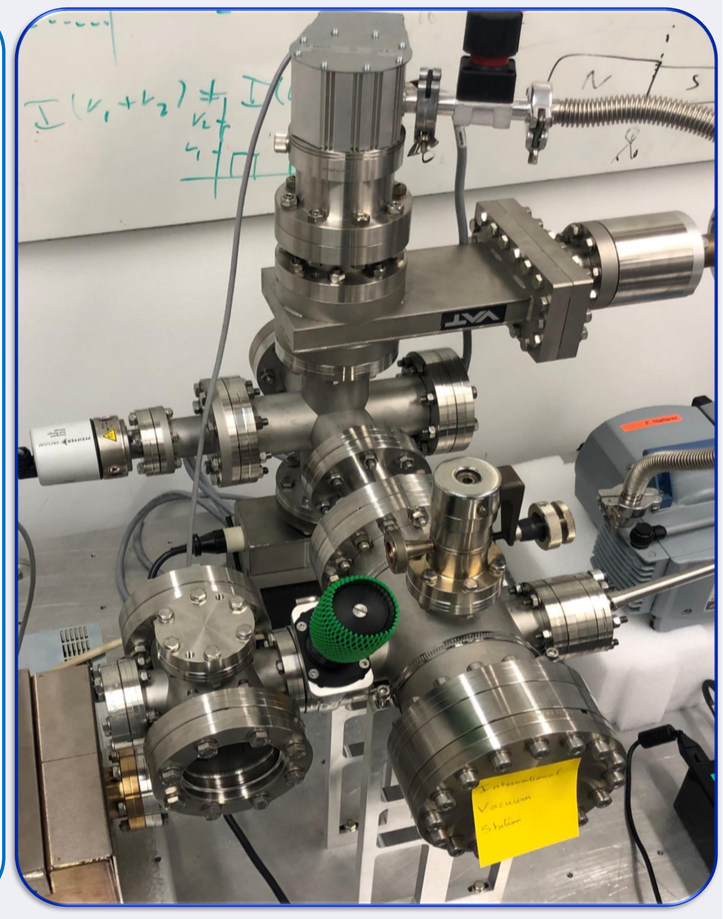


Fig. 2: Home-made RT-STM set up

2. First results: STM z-piezo calibration

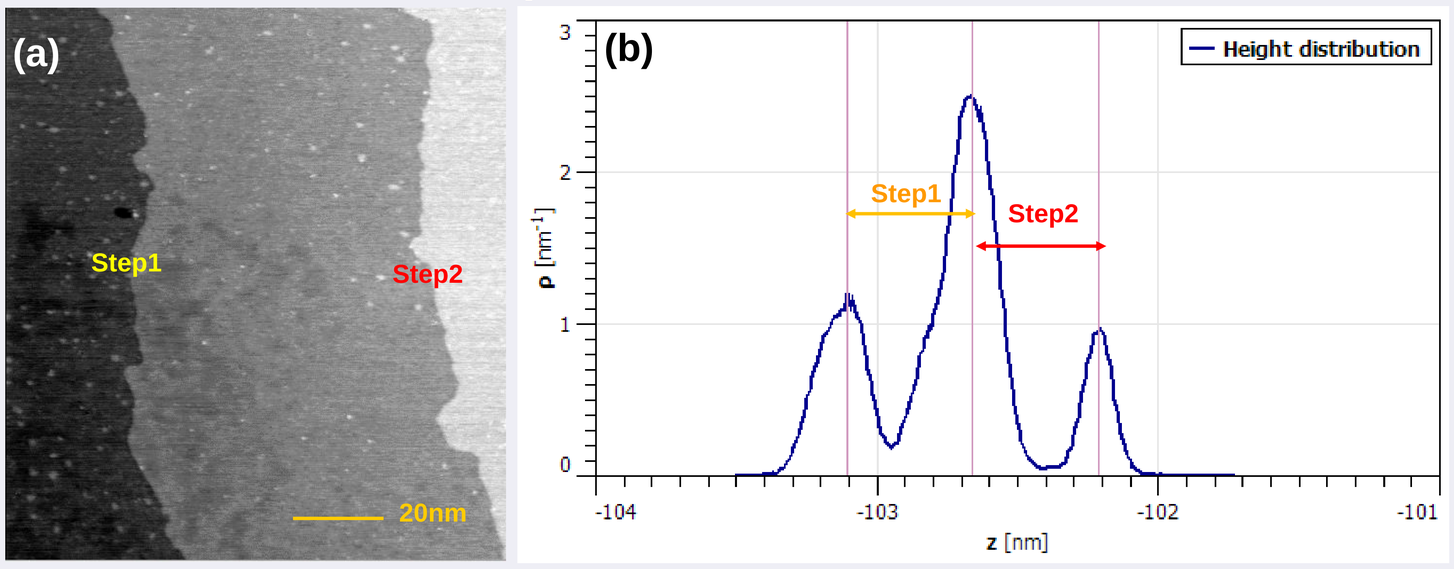
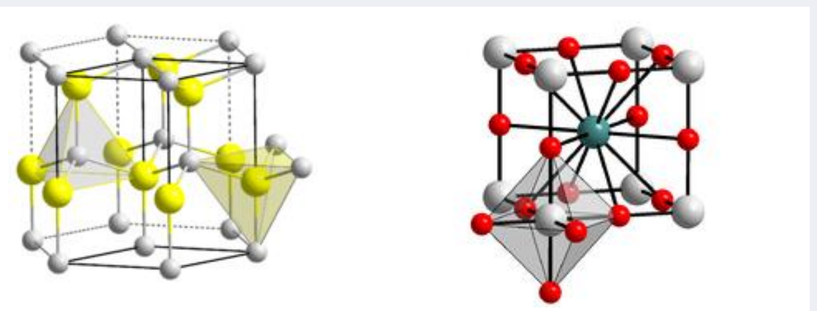


Fig.3: (a) RT-STM Image of Au(111) surface, measured at ambient conditions. Different contrast shows different surface heights. (b) Height distributions and peak differences are analyzed for z-piezo calibration.

Conclusion / Outlook



The purpose of this RT-STM is to develop tools (STM tip, AFM tuning fork, evaporator and cables), methods (lock-in and pump probe spectroscopy), and to prepare different sample growth recipes for future low temperature STM experiments.

3. AFM resonance tracking with PLL

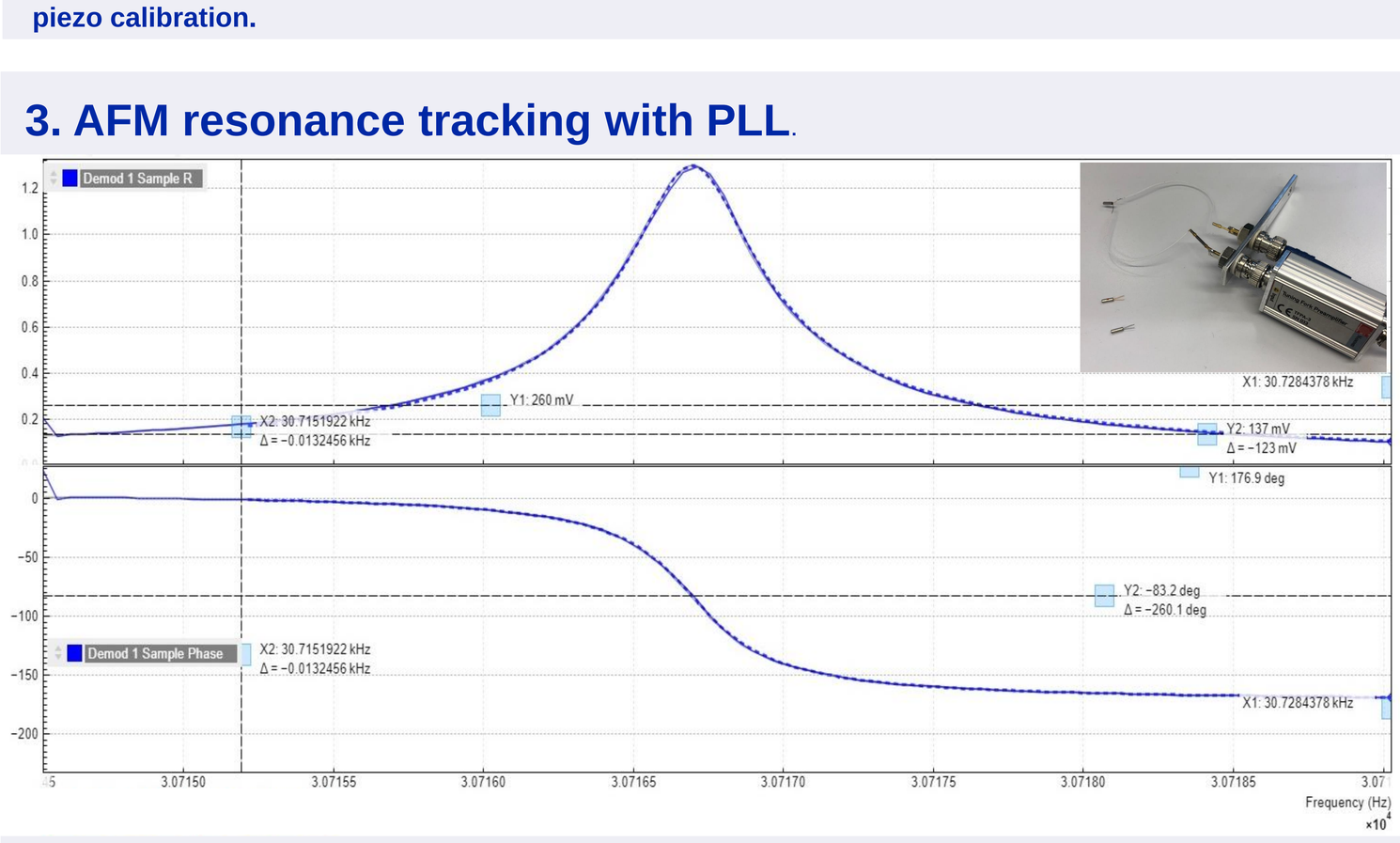


Fig.4: Amplitude (up) and Phase (down) of the AFM frequency response measured with the LabOne Sweeper. Solid line are measurement data, dashed line is a fit to the response function of an LCR circuit model using the resonance fitting tool. Insert: tuning forks and preamplifier.

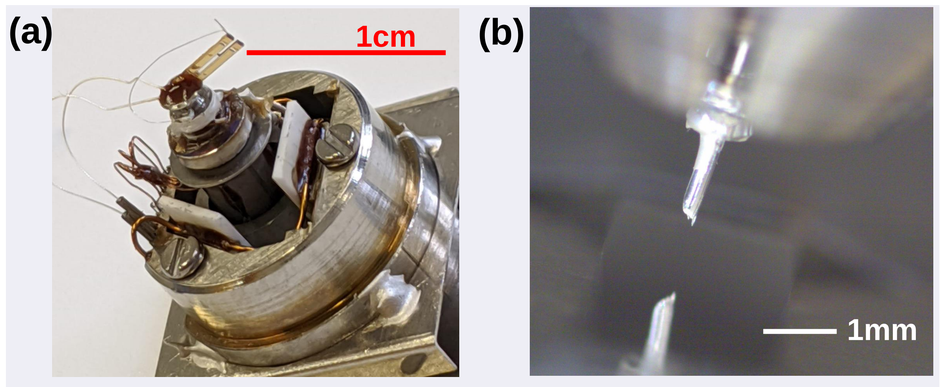


Fig.5: (a) Tuning fork on the scanner, used in STM/AFM mode,
(b) STM tip in mirror image when approaching to the sample.

Acknowledgement

We want to thank Ferrovac GmbH for providing us with the STM, Dominik Biscette for his contribution to the STM fabrication, Reto Maier and the Mechanical Workshop, Achim Vollhardt and the Electronic Workshop of the UZH Department of Physics.

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