Poster-1-33

High Dynamic Range STM

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This poster introduces a technique to expand the dynamic range of scanning tunneling microscopes (STM). By applying AC excitation, the nonlinear current-voltage characteristic is transformed into a time-dependent current. Compensating capacitor is then employed to actively cancel the dominant current harmonics. The compensating capacitor's strategic placement enables the generation of removal currents that effectively counteract those that would otherwise saturate the preamplifier. The removal of the first harmonic results in a predictable shift in conductivity and DC currents can be also removed with a blocking capacitor without affecting the local density of states.

[1] Ajla Karić, Carolina A Marques, Berk Zengin, and Fabian Donat Natterer, High dynamic range scanning tunneling microscopy. MethodsX, 13:102857, 2024.