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Imaging the Electron-Phonon Interaction on the Atomic Scale[1]
IGOR ALTFEDER, Air Force Research Laboratory, KONSTANTIN MATVEEV, Argonne National Laboratory, ANDREY VOEVODIN, Air Force Research Laboratory — New STM-based spectroscopic imaging technique, direct real-space imaging of electron-phonon interaction parameter λ, was demonstrated using the combination of STM and inelastic electron tunneling spectroscopy (IETS) for thin Pb islands epitaxially grown on 7x7 reconstructed Si(111). We found that λ increases when the electron scattering at the Pb/Si(111) interface is diffuse and decreases when the electron scattering becomes specular. We show that the effect is driven by transverse redistribution of the electron density inside a quantum well. Reference: Igor Altfeder, K. A. Matveev, A. A. Voevodin, "Imaging the Electron-Phonon Interaction on the Atomic Scale", Physical Review Letters 109, 166402 (2012).

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