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Local Work Function Approximation at Tip Induced Surface Vacancies by STM ANDREW DILULLO, Nanoscale and Quantum Phenomena Institute, Department of Physics and Astronomy, Ohio University, Athens, Ohio, DANDA PANI ACHARYA, Chemical and Materials Sciences Division, Pacific Northwest National Laboratory, Richland, Washington, SAW-WAI HLA, Nanoscale and Quantum Phenomena Institute, Department of Physics and Astronomy, Ohio University, Athens, Ohio — Local surface work functions are important for many surface interactions including surface chemistry, site-specific adsorbate binding, and macromolecule self-assembly. The scanning tunneling microscope can act as a probe of the local work function by measurement of resonances that occur in the field-emission regime, which are Stark-shifted image potential resonances. The energetic positions of field emission resonances are extracted from bias dependent topographic sequences. Using this technique, surface regions with step edges, and surface vacancies created by controlled probe vertical manipulations, had their field-emission resonance energies measured throughout the imaged regions. The extracted resonance energies were fit by Gundlach's equation resulting in reasonable approximations for local surface work function, probe work function, and absolute probe height. The induced surface vacancies are interesting, considering industrial approaches to nanoindentation, with use for independent determination of the work functions for these nearly zero-dimensional objects.

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