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The Ni(111) surface electrons investigated with low-temperature scanning tunneling spectroscopy KAI-FELIX BRAUN, Ohio University, Department of Physics and Astronomy, C.F.J. FLIPSE, Technical University of Eindhoven, The Netherlands., K.-H. RIEDER, Institut fr Experimentalphysik, Arnimallee 14, 14195 Berlin, Germany. — The electronic structure of the ferromagnetic Ni(111) surface has been attracting interest for a long time. Despite experimental and theoretical effort, reported values of binding energies, effective masses and number of the surface states and surface resonances differed substantially. Working with a local probe technique reveals relevant contributions from adsorbates and defects. Here we present an extensive scanning tunneling microscopy and spectroscopy investigation at low temperature, employing fourier transform methods for the analysis. The results show a parabolic surface state with an upward dispersion at –165 meV with a surprisingly low effective mass of 0.17 m_e and a downward dispersing surface resonance at –230 meV. From the decay of the standing wave pattern at step edges electron and hole lifetimes have been determined with values considerably smaller than found on noble metal surfaces. Details of the surface electronic structure have been revealed including an anti-resonance at the Fermi energy.

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