

Abstract Submitted  
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**Low-Energy Acoustic Collective Excitations on Metal Surfaces**

BOGDAN DIACONESCU, KARSTEN POHL, University of New Hampshire, US, LUCA VATTUONE, LETIZIA SAVIO, Università di Genova, Italy, PHILIP HOFMANN, University of Aarhus, Denmark, VYACHESLAV SILKIN, Facultad de Ciencias Químicas, Spain, JOSE PITARKE, Zientzi Fakultatea, Spain, EUGENE CHULKOV, PEDRO ECHENIQUE, Facultad de Ciencias Químicas, Spain, DANIEL FARIAS, Universidad Autónoma de Madrid, Spain, MARIO ROCCA, Università di Genova, Italy — Sound-like longitudinal plasma waves were thought to only exist in layered systems where spatially separated 2D electron plasmas are realized. Due to their low energy and linear dispersion such waves were proposed as possible candidates to mediate the attractive interaction leading to the formation of Cooper pairs in high TC superconductors. A new type of collective excitation mode on metal surfaces has been found. In contrast to the usual surface plasmon, it has an acoustic dispersion. For Be(0001) the mode was observed using EELS. Detailed ab-initio calculations show that it is caused by the coexistence of a partially occupied quasi-2D surface state band with the underlying 3D continuum in the same region of space. While it exists up to high energies for Be(0001), the mode as such has a very general character, for low energies it is expected to exist on many surfaces, profoundly affecting their electron and phonon dynamics. 1. V. M. Silkin et. al., Phys. Rev. B 72, 115435 (2005)

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