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Charged Defects in the Si(001) Surface STEVEN SCHOFIELD, London Ctr. Nanotech. and Dept. Phys. & Astron., UCL, London, UK, PHILIPP STUDER, London Ctr. Nanotech. and Dept. Electron. & Elec., UCL, London, UK, CYRUS HIRJIBEHEDIN, London Ctr. Nanotech., Dept. Phys. & Astron. and Dept. Chem., UCL, London, UK, NEIL CURSON, London Ctr. Nanotech. and Dept. Electron. & Elec., UCL, London, UK, GABRIEL AEPPLI, DAVID BOWLER, London Ctr. Nanotech. and Dept. Phys. & Astron., UCL, London, UK
— The Si(001) surface has been the subject of intense research for decades due to its ubiquitous use in the semiconductor industry, its applicability as a model semiconductor surface, and proposals for its use in novel quantum devices. Surprisingly, atomic-scale investigations using scanning tunneling microscopy and spectroscopy (STM/STS) continue to produce new insights into the structural and electronic properties of this deceptively simple semiconductor surface. Tip- and charge-induced band bending are generally considered to play only minor roles in measurements of silicon surfaces due to Fermi level pinning by surface states and defects. However, such effects become important when investigating charged defects and/or surfaces that have had their surface states removed through chemical passivation. We present high resolution STM images and spectroscopy data of defects in the Si(001) surface. We include band bending and charge state in the discussion of the results.

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