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Detecting the topographic, chemical and magnetic contrast at surfaces with nanometer spatial resolution H. CABRERA, D.A. ZANIN, L.G. DE PIETRO, A. VINDIGNI, U. RAMSPERGER, D. PESCIA, ETH Zurich, MICROSTRUCTURE RESEARCH TEAM — Since the mid of the 1980s and over the past few decades various conventional electron spectroscopies were combined with electron spin sensitivity to investigate the magnetic properties of surfaces and thin films, evolving into the Scanning-Electron-Microscopy with Polarization Analysis (SEMPA) technique, which made it possible to directly observe the re-entrant transitions of magnetic-domain patterns in thin films of Fe on Cu(001) with several tens of nm resolution. The possibility of resolving magnetic-textures in direct space at atomic scale may trigger both fundamental perspectives and novel applications. Inspired by the Russell Young topografiner we redesigned the SEMPA setup by replacing the primary electron beam source and the probing method. We dubbed this new technique Near Field-Emission Scanning Electron Microscopy (NFESEM). Recently, we have used NFESEM to map the surface of some metals and semiconductors with nanometer lateral resolution. We report here on the latest results showing energy-resolved surface images and the first attempt to endowing this technique with the polarisation analysis of the detected secondary electrons by using of a Mott-detector, emphasizing the true potential of this new technique.

H. Cabrera
ETH Zurich

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