

“Exploring chemistry and magnetism at the nanoscale by synchrotron x-ray scanning tunneling microscopy”

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The real-space observation of chemistry and magnetic structure using scanning probe microscopy (SPM) methods or synchrotron-based x-ray microscopy (XM) continues to have a tremendous impact on our understanding of functional materials. However, although SPM methods provide high spatial resolution, they typically lack direct chemical contrast and the ability to quantify magnetic moments. On the other hand, XM can provide chemical as well as magnetic sensitivity, but the spatial resolution is inferior. In order to overcome these limitations, we have developed a new technique that combines synchrotron radiation with the high spatial resolution of scanning tunneling microscopy (STM). The goal is to combine the spin sensitivity and chemical contrast of synchrotron x-rays with the locality of STM.