

Scanning probe microscopy studies in functional oxide thin films: from ferroelectricity to local transport

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For the past three decades, scanning probe microscopy (SPM) has emerged as one of the most powerful tools to probe various physical phenomena in materials on the (sub-)nanometer level. Using the nano-sized sharp tip, we can visualize topography of the material surface. Furthermore, we can measure various physical responses, such as force change, current, and mechanical displacement, depending on the stimulus that we applied via the tip. In this seminar, I will present my recent SPM study results in functional oxide films. First, I will briefly introduce the principles of several SPM modes, including piezoresponse force microscopy (PFM) and conductive-atomic force microscopy (c-AFM). Then, I will talk about PFM studies on the ferroelectricity and flexoelectricity in oxide films. Finally, I will present c-AFM studies to investigate local electronic/ionic transport in various oxide heterostructures.