

A milestone in the development of nanoscience and nanotechnology was the invention of scanning tunnelling microscope (STM) 35 years ago. Only five years later, atomic force microscope (AFM) was also invented. Nowadays, numerous variants of scanning probe microscopies are routinely used in scientific and applied research. However, understanding and interpreting the images is not yet straightforward in many cases in particular when an atomic resolution is achieved. Joint experimental-computational-theoretical studies are therefore the common practice in this context. In this talk, a multiscale model and its application to the so-called Kelvin probe force microscopy will be presented. Both mesoscopic and microscopic contributions are considered to explain the atomic scale contrast observed in the local contact potential difference over nonconducting surfaces. A few further applications of the model will also be presented.