
S E M I N A R
aus
Halbleiterphysik und Nanotechnologie

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**Piezoresponse Force Microscopy (PFM):
From imaging ferroelectric domains towards a quantitative
characterization of ferroelectrics**

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Scanning force microscopy (SFM) has evolved into a standard tool not only for determining the surface quality but to a greater degree also for investigating various material properties. Thus in addition to imaging the topography with an impressive resolution, also electric or magnetic characteristics of the sample can be determined, just to name two examples. PFM, a rather recent variety of SFM, is known as an easy to use technique for imaging ferroelectric domain patterns with high sensitivity (sub pm/V) and excellent lateral resolution (few nm). These numbers being indeed impressive, a quantification of PFM data, thus allowing to derive the properties of ferroelectrics such as the piezoelectric coefficients or the coercive field, is highly demanding.

In my talk, I will introduce the colorful world of SFM with specific regard to PFM, and, in conjunction with that, also explain the physical basics of ferroelectrics and give examples of their broad usage. Their quantitative characterization being one of my pet issues, I will in addition present some difficulties and pitfalls when recording PFM-data.