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Application of the X-ray Standing Wave Technique to Materials Research.

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Normal Incidence X-ray Standing Waves (NIXSW) is a powerful technique based on synchrotron radiation, which can be employed for structural determination of adsorbate-covered surfaces and for investigating the local environment of subsurface diluted species. Due to the specific photon energy range that is commonly needed for these measurements there are only few end-stations available in the world, however the technique has been enjoying a renaissance in the last decade. In this contribution I will describe the fundamentals of the NIXSW technique, its structural sensitivity and special advantages. Moreover, to clarify the range of possible applications I will present some illustrative examples taken from our recent research at the Physics Department (TU Munich) and concerning 1) ultra-thin films of adsorbed metal complexes, 2) monolayers of functional 2D materials, and 3) doping of semiconductor crystals (e.g., titanium dioxide) of photocatalytic interest, respectively.

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