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# Structure of thin layers and nanoparticles

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We use a broad range of x-ray-based methods, such as x-ray diffraction, x-ray scattering and x-ray spectroscopy for the study of various types of nanostructures. In the last decade we have dealt with semiconductor and metallic nanoparticles and quantum dots in single-crystalline and amorphous matrices. We have investigated the structure of these objects by x-ray diffraction, small-angle x-ray scattering, and x-ray absorption spectroscopy (methods EXAFS and XANES). We are also studying defects in semiconductor epitaxial layers by reciprocal-space mapping method and by numerical simulations based on the Monte-Carlo approach.

Quite recently we have started a study of the structure of new materials, like antiferromagnetic semiconductor layers and topological insulators. We perform the experiments in the x-ray lab of the Department of Condensed Matter physics, however we are frequently using various synchrotron sources – ESRF (Grenoble), ANKA (Karlsruhe) and ELETTRA (Trieste).

## Selected outputs

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- J. Šmilauerová, P. Hrcuba, J. Stráský, J. Stráská, M. Janeček, J. Pospíšil, R. Kužel, T. Brunátová, V. Holý, and J. Ilavský: Ordered array of omega particles in beta-Ti matrix studied by small-angle X-ray scattering. *Acta Mater.* 81, 71-82 (2014).
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