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# Synchrotron radiation study of topological insulators at ASTRID

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The research of new materials with novel properties is one of the fundamental principles of the technological advancement. The discovery of peculiar electronic properties has often historically been proved to lead to huge leaps in the field of technology. Recently many of the predicted technological limits of the materials are close to be reached and the research has to be focused again on innovative materials.
In the last decade insulators with previously unknown electronic properties have been discovered: the so called Topological Insulators (TI). These materials, with the relevant quality to be insulting in the bulk but good conductors on the surface, represent a previously unknown state of matter. As added value the electron motion along the topological gapless surface states is coupled to the electron spin, making of these materials the most promising candidates in the field of spintronics and quantum computing. Moreover TIs are also believed to give rise to completely new physical phenomena.
The lack of knowledge in such recent field grants to the fundamental research the highest priority to support future engineering application. The exotic effects theoretically foreseen in particular topological systems require now a thorough experimental prove of the physics behind.
In this contest, as in many others, synchrotron radiation-based research has proven to be most effective and fruitful; thanks to the wide range of photon energies the synchrotron provides we can access information otherwise undetectable by any other mean.
This project is aimed to explore the electronic properties of new TI systems such as TI nanostructures and thin films and it profits of the constant access to the SGM3 beamline at the ASTRID synchrotron.
We here present the main features of the topological insulators as well as the importance of synchrotron light based Angle Resolved Photoemission Spectroscopy technique; in the end a brief review of the most recent results is shown.

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