Contribution ID : **261** Type : **Invited Oral**

Towards ARPES at the Australian Synchrotron: 3rd Generation Toroidal Angle Resolving Electron Energy Spectrometer

Tuesday, 14 August 2018 16:15 (30)

Angle Resolved Photoelectron Spectroscopy (ARPES) is the "complete" photoemission experiment. It simultaneously measures a photoelectron's kinetic energy, emission angle and sometimes spin, relative to the crystallographic axes, constructing a direct image of the electronic bandstructure. This makes ARPES the most powerful contemporary technique for determining the electronic structure of novel materials. ARPES has been instrumental in the discovery and understanding of new electronic phases of matter. For example, important aspects of the electronic structure of high-Tc superconductors, such as the pseudogap were discovered using ARPES, as was the experimental discovery of three dimensional topological insulators Bi1-xSbx and Bi2(Se,Te)3.

Over the years, a dramatic improvement in the energy and momentum resolution possible with ARPES has occurred as a result of advances in photoelectron analysers and 2D detectors, allowing a range of new physics to be probed. Despite the popularity of ARPES overseas, within Australia it has until now remained as a niche technique due to a small (albeit dedicated) user community. However, the continually growing local interest in studying novel materials with exotic electronic properties has led to the demand for our own synchrotron – based ARPES instrument. Here, an overview of a forthcoming ARPES instrument, an advanced 4th generation "toroidal" electron spectrometer,at the Australian Synchrotron will be given. An advanced helium discharge lamp allows for offline work to be carried out. In contrast to the previous 3rd generation instrument installed at BESSY2, the 4th generation Toroidal Analyser is equipped with a liquid helium cryostat and radiation shielding to allow for ARPES measurements to be conducted with the sample at cryogenic temperatures. An overview of the system's principles of operation, and sample preparation environment will be given.

Primary author(s) : TADICH, Anton

Presenter(s) : TADICH, Anton

Session Classification : Speaker Sessions and Seminars

Track Classification : Vacuum Science and Technology