Karlsruher Institut für Technologie

Laboratorium für Applikationen der Synchrotronstrahlung (LAS), und

Institut für Photonenforschung und Synchrotronstrahlung (IPS)
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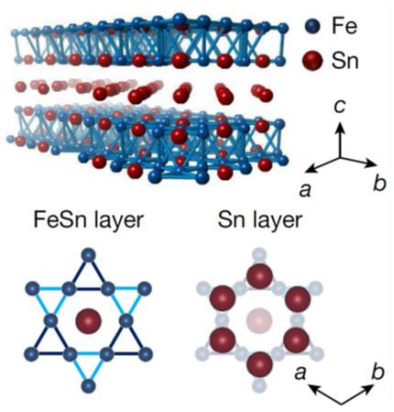
Master thesis at the Institute for Photon Science and Synchrotron Radiation (IPS)

Growth and characterization of thin FeSn kagome films



Crystal structure of the kagome metal Fe_3Sn_2
Credit: *Nature 562, 91 (2018)*

Kagome basket weaver in Japan
Credit: *Wikimedia Commons*

Motivation:

The kagome structure is a hexagonal mesh lattice named after the traditional Japanese woven bamboo pattern. Materials with a kagome structure exhibit exotic physical behavior such as quantum spin liquids, topological insulators, Dirac or Weyl fermions, magnetic skyrmions etc. In thin kagome films, these properties remained hitherto unexplored.

Scope of the thesis:

The aim of this master thesis is to grow kagome Fe_3Sn_2 thin films and to achieve a basic understanding of the magnetism and lattice dynamics of this new material. You will acquire knowledge and hands-on experience in growth of thin layers by molecular beam epitaxy and characterization by electron and X-ray diffraction methods. Depending on the progress, the work can be completed with experiments with the produced thin Fe_3Sn_2 films at the Deutschen Elektronen-Synchrotron (DESY, Hamburg).

Topics:

- Surface physics / nanostrcutures
- molecular beam epitaxy
- Vacuum technology
- Synchrotron radiation methods

Start after consultation

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