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## Use of synchrotron radiation at the University of Helsinki

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The history of x-ray physics at University of Helsinki, Finland, dates back to the 1960's when systematic x-ray crystallographic studies were started at the Department of Physics. In the 1970's, x-ray Compton scattering spectroscopy [1] was introduced, then using the home-lab based x-ray sources. Synchrotron radiation use in Helsinki started already in the 1970's since the work of prof. Pekka Suortti (now emeritus) at Brookhaven's National Synchrotron Light Source (NSLS). He worked with synchrotron radiation techniques including designs of beamlines and their application to spectroscopy, x-ray diffraction, including the resonance phenomena, and medical imaging. In the 1980-1990 period many researcher visits were made to Daresbury and HASYLAB as well. In the early 1990's Keijo Hämäläinen (currently vice-rector of University of Helsinki) developed various x-ray scattering spectroscopies at NSLS, and became well known in the field of x-ray spectroscopy from his utilization of resonant x-ray emission spectroscopy to yield much more information on the electronic structure than regular x-ray absorption spectroscopy can yield [2]. The "Hämäläinen method" was based on the recording of resonant x-ray emission peak intensity when incident photon energy is tuned across an x-ray absorption edge. The variations of the intensity could be interpreted as x-ray absorption spectra with an elimination of the deep core-hole lifetime broadening. This is even now a modern tool for x-ray spectroscopy, often called these days as high-energy-resolution fluorescence-detected (HERFD) x-ray absorption spectroscopy [3].

Currently the x-ray and synchrotron science in Helsinki is led by prof. Simo Huotari who is a frequent visitor to, e.g., European Synchrotron Radiation Facility and has specialized in inelastic x-ray scattering spectroscopy and other x-ray spectroscopies.

Some of this history and recent Helsinki research activities in the field of synchrotron as well as home-lab x-ray spectroscopies and imaging will be shown.

[1] X-ray Compton scattering, eds. M. J. Cooper et al., Oxford University Press (2004).

[2] K. Hämäläinen, D. P. Siddons, J. B. Hastings, and L. E. Berman, Phys. Rev. Lett. 67, 2850 (1991).

[3] P. Glatzel, Introduction to XAS/XES, <http://www.pieter-glatzel.de/XASXES.html>. Retrieved 2nd May 2017

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