



	Experiment title: Effect of thermal disorder on Compton profiles of Aluminium	Experiment number: HE-577
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Report:

The results of this experiment have been published as:

C. Sternemann, T. Buslaps, A. Shukla, P. Suortti, G. Döring, and W. Schülke, *Temperature influence on the valence Compton profiles of aluminium and lithium*, Phys. Rev. B **63**, 094301 (2001)

Abstract:

We present temperature-dependent valence Compton profiles of single-crystalline Al and Li measured with 30 keV incident energy and 173° scattering angle with momentum space resolution of 0.1 a.u. The valence profiles for both samples measured at low temperature are above the high-temperature ones at momentum $p_z \approx p_F$, the Fermi momentum, and below at $p_z = 0$ a.u., which corresponds to a narrowing of the valence Compton profiles with increasing temperature. This fundamental temperature dependence can be attributed to the variation of the lattice constant and thus the variation of the Fermi momentum with temperature when the experimental results are compared with jellium calculations of the valence Compton profiles utilizing a correlation corrected occupation number density. In addition the Li experiment shows a significant temperature dependence even for $p_z > p_F$, which is assigned to the diminished contribution of higher momentum components to the valence Compton profile with increasing temperature. The Li results are in good agreement with calculations using an empirical temperature-dependent local pseudopotential.

