ESRF	**Experiment title:** Correlation effects in ε-FeSi studied with Compton scattering	**Experiment number:** HE-271
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Shifts: **20**	**Local contact(s):** Thomas Buslaps	*Received at ESRF:*

Names and affiliations of applicants (* indicates experimentalists):

*G.R. Castro, J. Alvarez, *T. Buslaps, *A. Shukla, V. Honkimäki; ESRF
T. Jarlborg ; University of Geneva

Report:

The experiment was motivated by the renewed discussion about the temperature dependence of the electronic structure in ε-FeSi which has been proposed to be the first example of a Kondo-type insulator based on d-electrons. A direct evidence of a Kondo-like resonance near the Fermi energy was given by recent photoemission data showing an increase in the spectral weight of a narrow band when decreasing the temperature down to 25 K. The aim of this experiment was to investigate the possible changes in the electron momentum density by measuring Compton profiles along two different directions at room temperature and at low temperature.

A single crystal of size 9 x 9 x 1.3 mm was mounted on a closed cycle cryostat. One data set with better statistics and less resolution (ΔP_z = 0.22 *a.u.*, statistical accuracy at the Compton peak maximum: 0.08%) and a second set with less statistical accuracy and better resolution (ΔP_z = 0.14 *a.u.*, statistical accuracy at the Compton peak maximum: 0.12%) was recorded at room temperature and at 20K.

The difference Compton profile from these two temperatures gave no evidence for a change in the momentum density. From this we could conclude that the temperature dependent changes in the electron momentum density are below the detection limit given by our statistical accuracy and resolution in momentum space. This indicates that the temperature dependent correlation effects are less prominent in the wave function which determines the Compton profile than in the electronic density of states sampled in a photoemission experiment.

A further analysis of the experimental Compton profiles will be done by comparison to theoretical calculations which are in progress.