ESRF	**Experiment title:** Structure investigation of the liquid Ag-Bi alloy using anomalous X-ray scattering in reflection geometry	**Experiment number**: HS-1184
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Report:

The aim of the experiment was to get different weighted total scattering functions of molten Ag-Bi alloys (containing 10, 30, 40 and 60 at.% Ag) using anomalous scattering, which subsequently allow the determination of partial structural functions. The scattering power of every constituent of the alloy was varied by the use of two different incident energies slightly below an absorption edge of the considered constituent. The energies chosen were 25.28 keV and 25.48 keV (due to Ag K-edge) and 13.18 keV and 13.28 keV (due to Bi L_{III}–edge).
The samples were hold in graphite crucibles placed in a commercial high-temperature chamber (Bühler HDK2.4) which was filled with helium after evacuation. The scattering intensity from the free sample surface was measured in reflexion geometry at temperatures of 20 K above the liquidus line at every energy mentioned above. To separate the elastic scattering a monochromator crystal (graphite or Germanium) was inserted in the scattered beam.

It turns out that there was a parasitic scattering which became more spurious when measuring at the two high energies and which could not be suppressed. This leads subsequently to difficulties in the normalization procedure to obtain the Faber-Ziman structure factors S(Q), which were finally calculated from the measured intensities by

$$S(Q) = \frac{I_A^{coh}(Q) - c_1 c_2 (f_1 - f_2)^2}{(c_1 f_1 + c_2 f_2)^2}$$

c_i , f_i - concentration and scattering factor of atomic species i

I_A^{coh} - coherent scattering intensity per atom

As seen in fig.1 not all S(Q) do oscillate reliably around a horizontal line over the whole Q-range in the case of the two highest energies. Furthermore, the differences between the S(Q) measured at different energies for the same alloy are only week. This makes the calculation of partial structure functions difficult, which does not result in satisfactory curves.

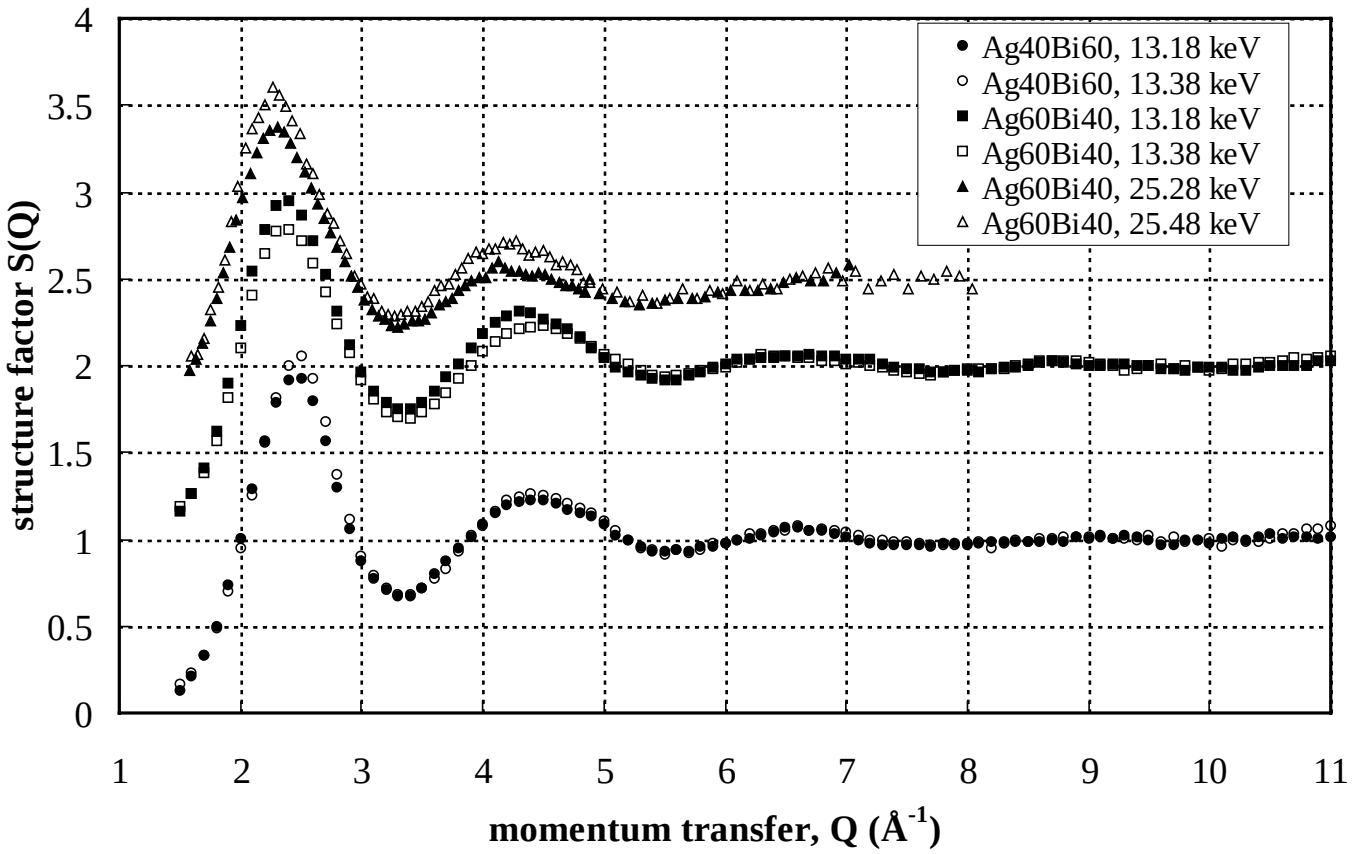

Figure 1 *Structure factors of molten $Ag_{60}Bi_{40}$ and $Ag_{40}Bi_{60}$ at different energies*