ESRF	**Experiment title: Anomalous Diffraction on a Single-Domain Al-Cu-Fe Quasicrystal**	**Experiment number:** HS-446
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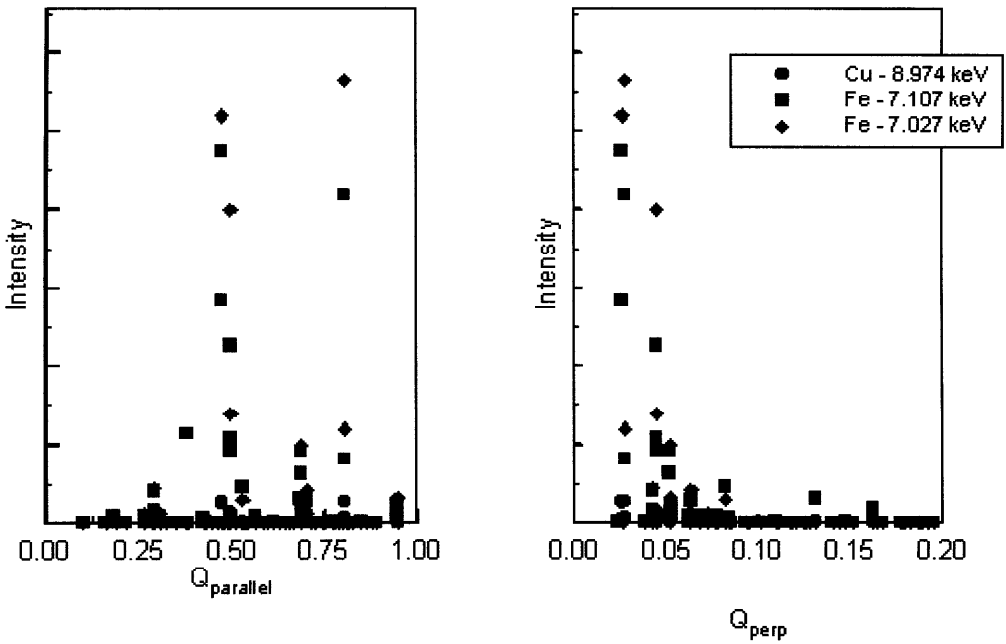
Report:

This experiment is designed to gain information on the Fe and Cu decoration of the quasiperiodic lattice in icosahedral AlCuFe. The method is anomalous diffraction on the K-edges of both Fe and Cu, and the results are to be compared to ^{57}Fe nuclear resonant diffraction experiments on the same single grain crystal. In the time allotted, it was possible to measure at three different gamma energies, just at the Cu K-edge (8.979 keV) at 8.974 keV, and at the Fe edge (7.112 keV), at 7.107 and 7.027 keV. A series of 10 1 different reflections have been studied. The measured Bragg intensities have been corrected for polarisation effects, for changes in scattering volume, as well as for temperature effects. Lorentz corrections have also been made. The diagram below shows the corrected line intensities as a function of the "parallel-space" scattering vector $Q_{parallel}$, as well as the "perpendicular space" scattering vector Q_{perp}. We see very large effects of anomalous scattering: on almost all the reflections with $Q_{perp.} < 0.1$ A-', the scattered intensity before the Fe-edge (7.027 keV) is much stronger than at the edge (7.107). This effect is due to the changing contrast between Fe and Cu for these reflections. These results (which must first be completed with another run just below the Cu K-edge) will now be used to study the different models proposed for the Fe and Cu decoration on AlCuFe quasicrystals.



These include both the perfect quasicrystalline crystal model of Katz and Gratias, as well as the random tiling model. For this, we are working both with the group of denis Gratias (Paris) as well as the group of P. Kramer, Tübingen.