ESRF	**Experiment title:** Thermal diffusivity of deep mantle minerals	**Experiment number**: Es-261
Beamline: ID06-LVP	**Date of experiment**: from: 8th July 2015 to: 13th July 2015	**Date of report**: 21st August 2015
Shifts: 15	**Local contact(s)**: Wilson Criton	*Received at ESRF:*

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Report:

We planned to measure the thermal diffusivity of the high pressure polymorphs of $(Fe,Mg)_2SiO_4$ using the X-radiographic Angstrom method we have developed. Whilst in the current study we did not achieve all that we set out to do, we have shown that the technique is viable at the ESRF although beam-line optics make the measurements more challenging. The limitations of the ID06 beamline for our technique are the size of the beam (which we knew about in advance) and the X-ray imaging system (which we did not).

The beam size at ID06-LPV at the ESRF is of the order of 0.7mm high and 2mm wide. Whereas previously the beamlines we have used have been able to illuminate a 2 × 3mm area of the sample which enabled us to use relatively long samples which were ~1.8mm diameter, at ID06 our samples had to be significantly shorter (~0.7mm long).

The standard X-radiography camera fitted to the beam-line, whilst sufficient for most purposes, proved to be too noisy to collect the images we required. When replaced with a more advanced camera with a Peltier-cooled CCD the images were of sufficient quality for us to be able to resolve the signal in our image processing pipeline.

The experiments that we did manage to perform in the time available have enabled us to measure for the first time the thermal diffusivity of hydrous wadsleyite. Whilst data analysis is ongoing, preliminary analysis of the data showed that the thermal diffusivity of hydrous wadsleyite is significantly lower than that measured previously for dry wadsleyite.