ESRF	**Experiment title:** In situ fatigue at the micron scale: Influence of stacking fault energy	**Experiment number**: MA-1726
Beamline: BM32	**Date of experiment**: from: 03.07.2013 to: 09.07.2013	**Date of report**: 01.09.2013
Shifts: 18	**Local contact(s)**: Dr. Jean-Sébastien Micha	*Received at ESRF:*

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Report:

Aim of the proposed experiment was to understand the influence of stacking fault energy on the fatigue damage accumulation (irreversible dislocation storage) in micron sized samples.

To improve the reproducibility of our experiment the SSD [1] was modified considerable: A generator providing a sinusoidal load was implemented allowing for multiple cycles beeing made within one segment.

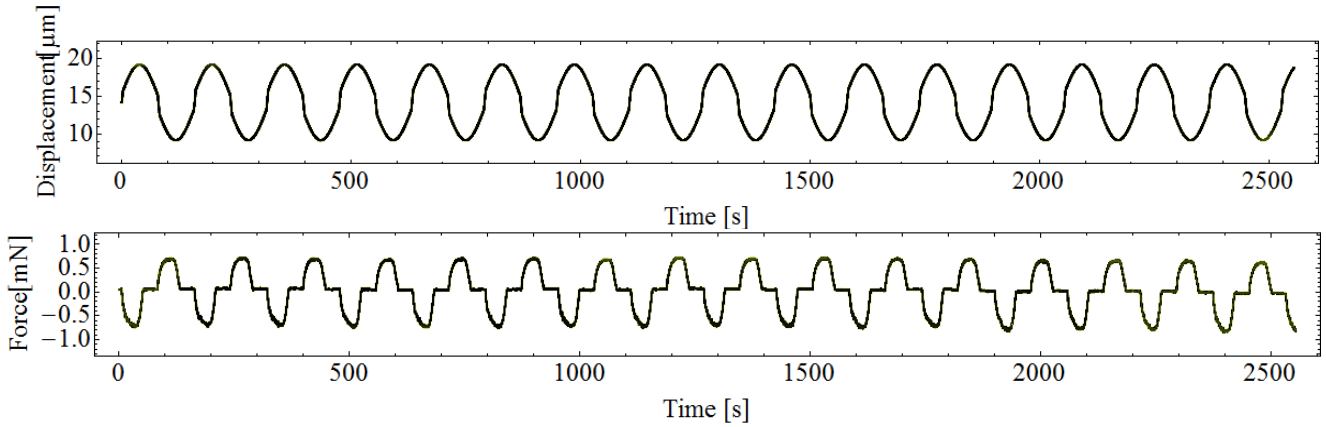

Fig. 1 Displacement vs Time and Force vs. Time Curves recorded during MA-1726.

Tab. 1 Summary of tested Samples during MA-1726

	Cycles	**Meshscans**	**Patterns**
ESRF_Ag1	127	15	8171
ESRF_Ag2	29	3	3880
ESRF_Ag3	100	3	6768
ESRF_Ag4	43	4	7500

Four different samples were tested during the beamtime. Main problem during the beamtime was the fact, that we were not able to monitor the Ag fluorescence in a nice way which complicated the sample positioning with respect to the x-ray beam. The experiment and the µLaue endstation of BM32 worked very well.

The data are currently processed. Time, force, displacement and Laue images have been correlated. Peak fitting and indexing is currently underway.

The experiments are well able to tackle the asked questions and we are looking forward to a pulication in a material science journal like Acta Materialia in the next two years.

[1] C. Kirchlechner, J. Keckes, J.S. Micha, G. Dehm. In situ µLaue: Instrumental setup for the deformation of micron sized sample, Advanced Engineering Materials 13 (2011) 837-844.