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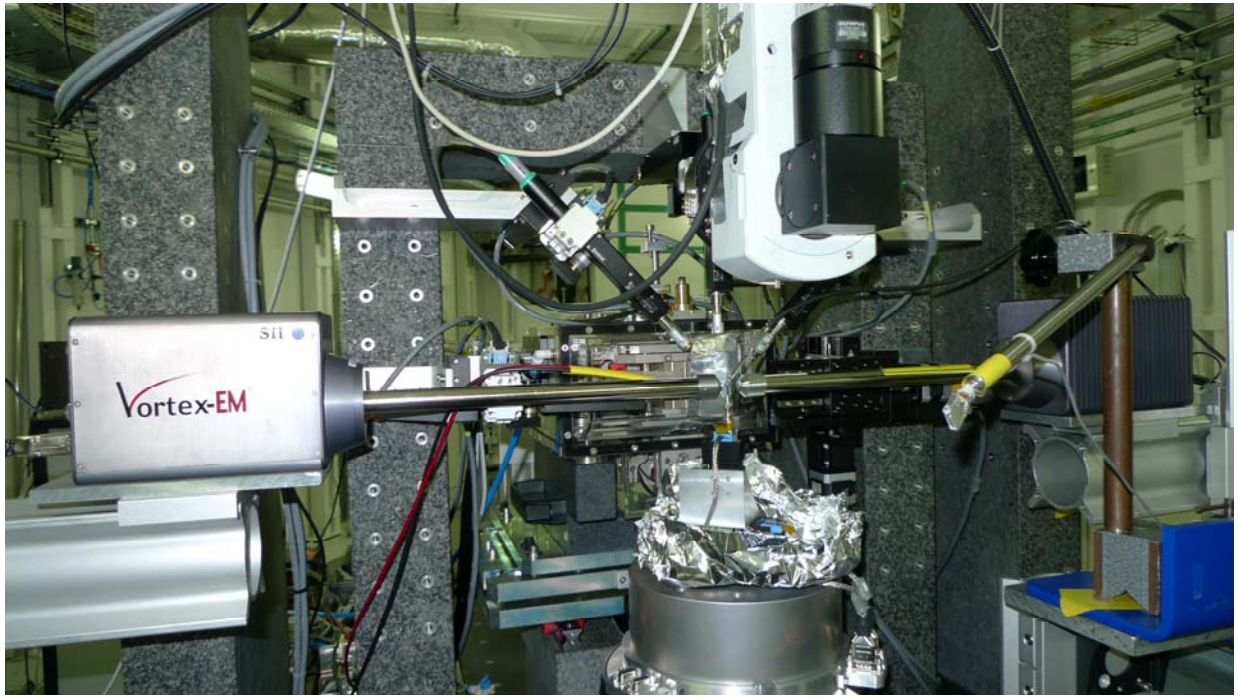
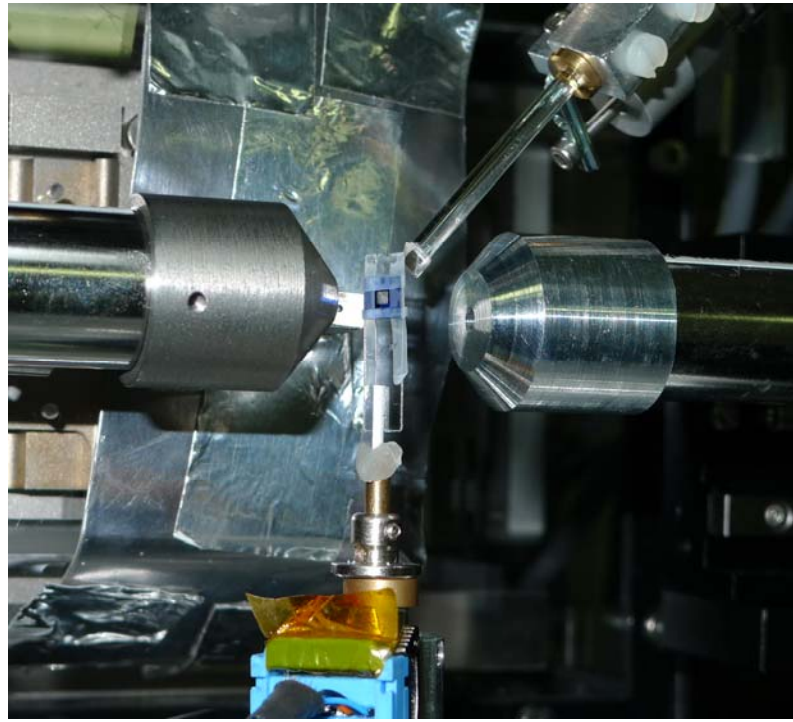
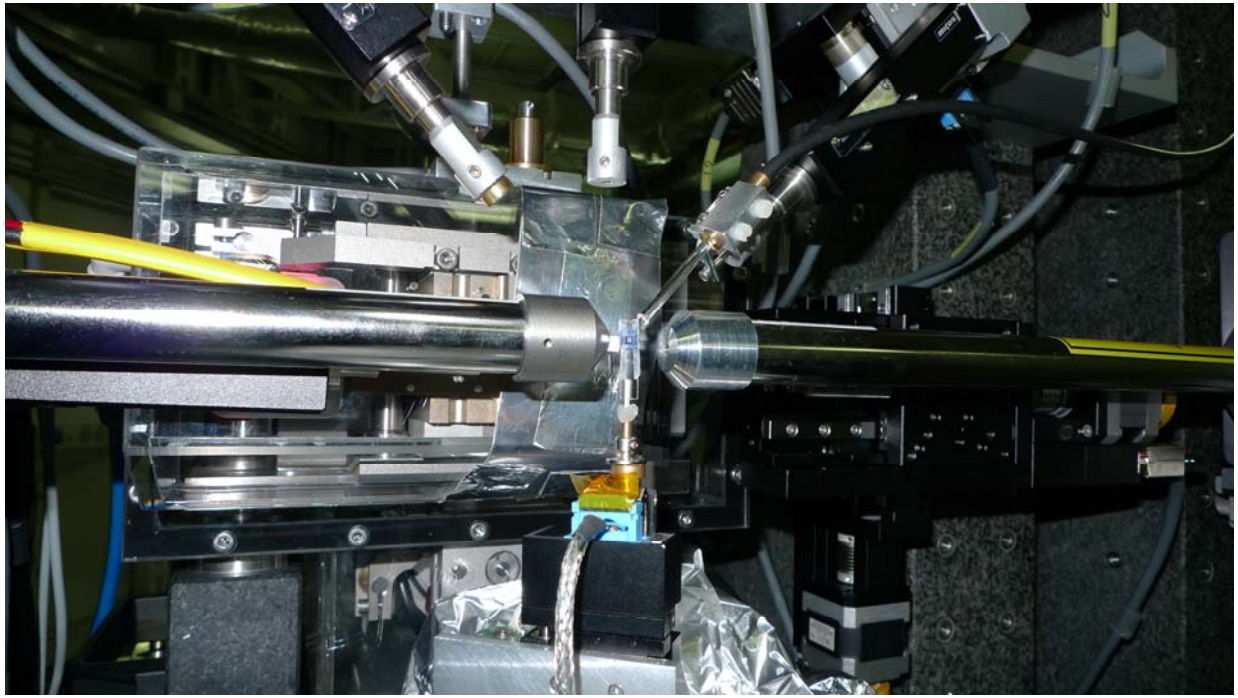
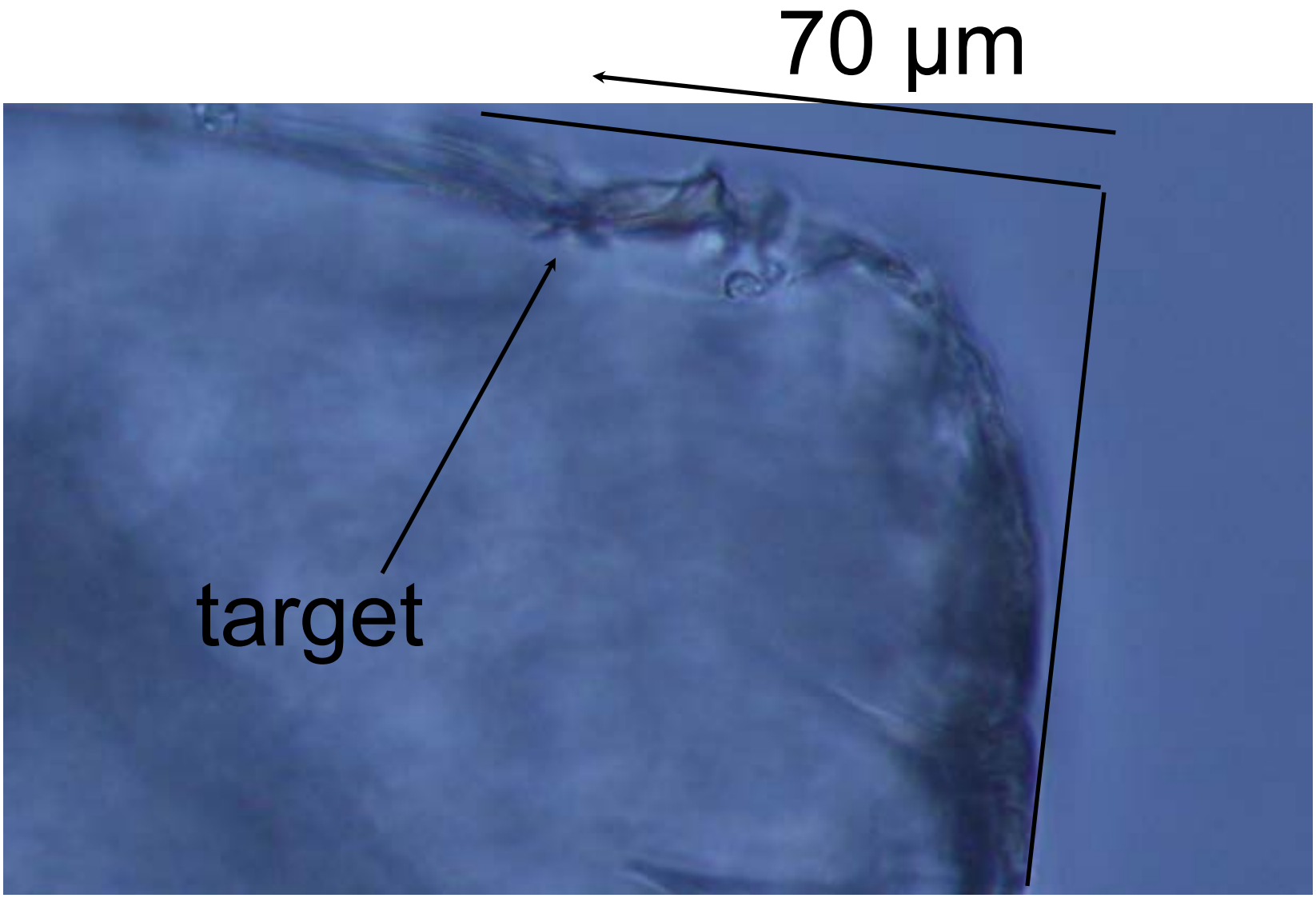

SII
Vortex-EM





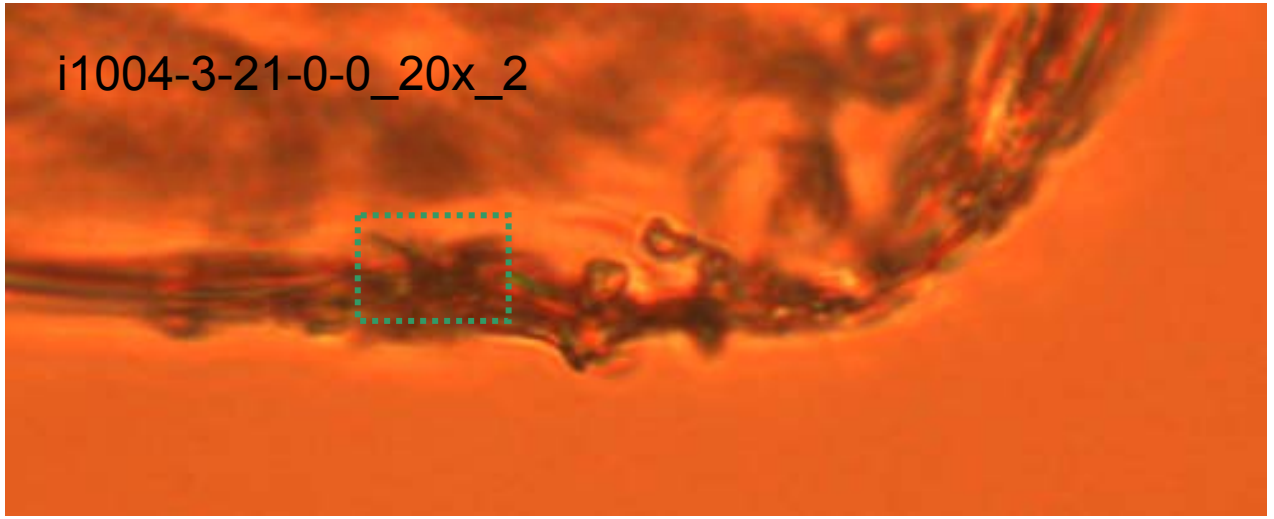
I1004,3,21,0,0

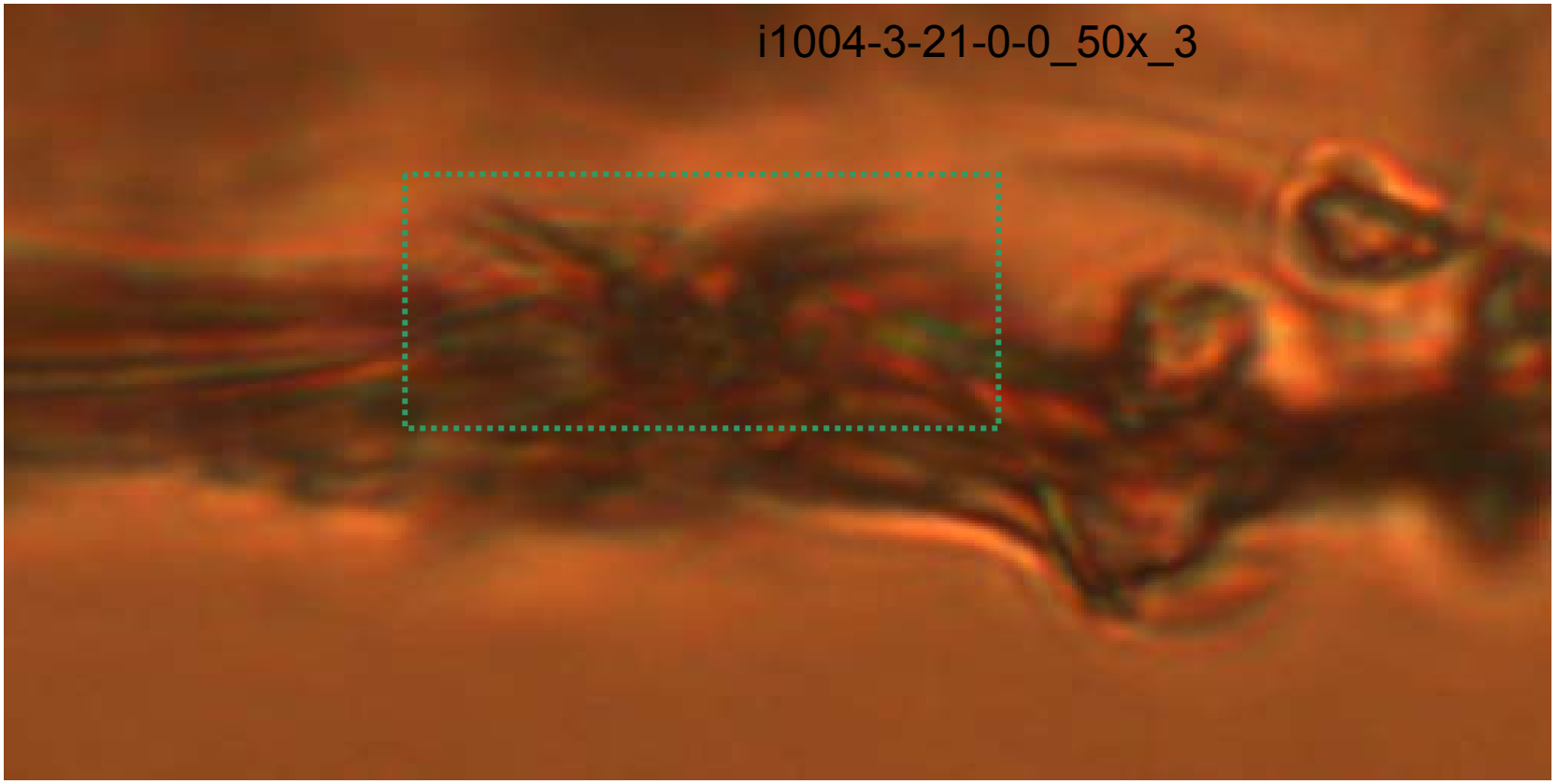
Received from A. Westphal



I1004,3,21,0,0

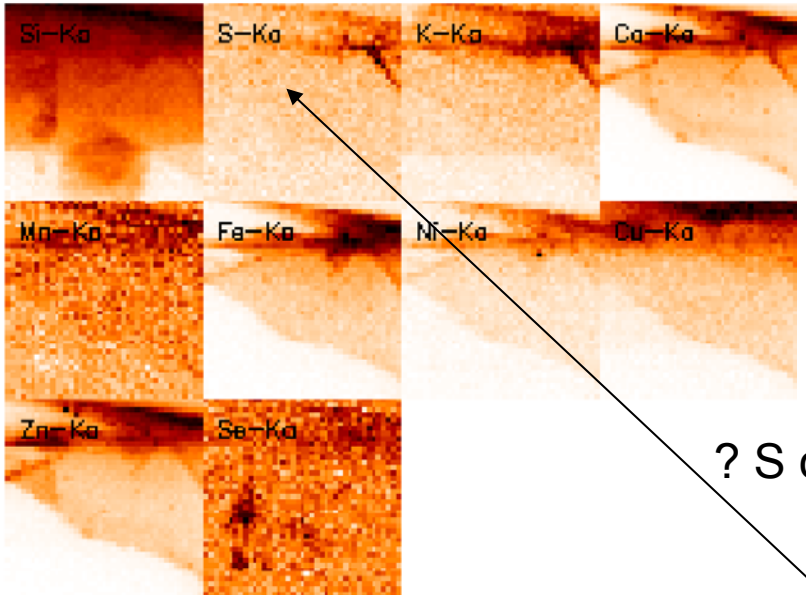
Microscope images
ESRF ID13





fb0_63i.ps (Mo collimator)

I1004,3,21,0,0



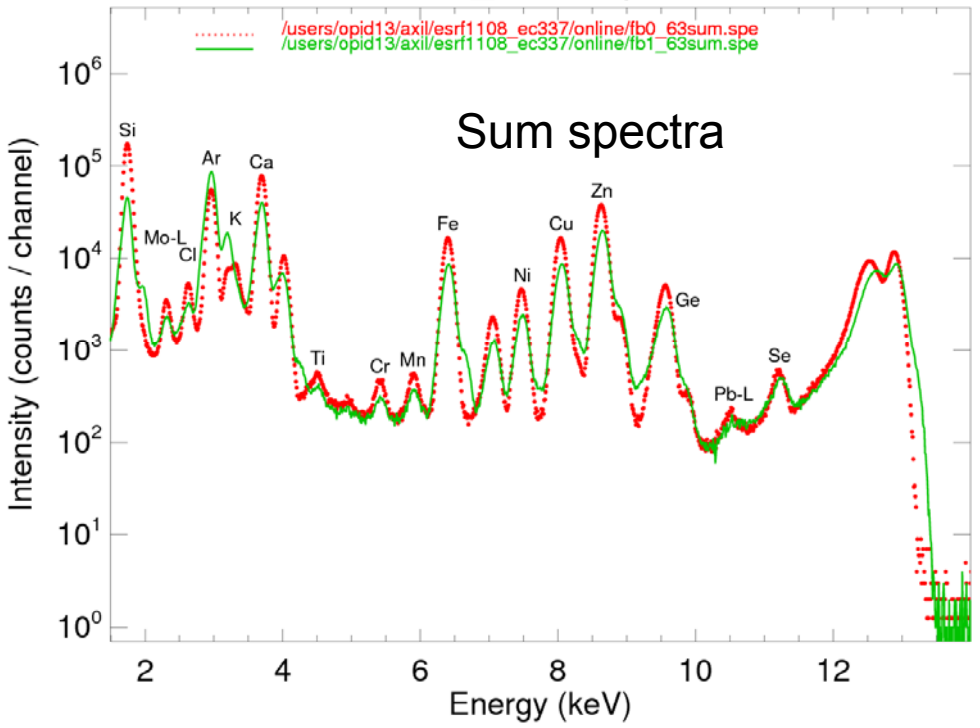
Scan 19

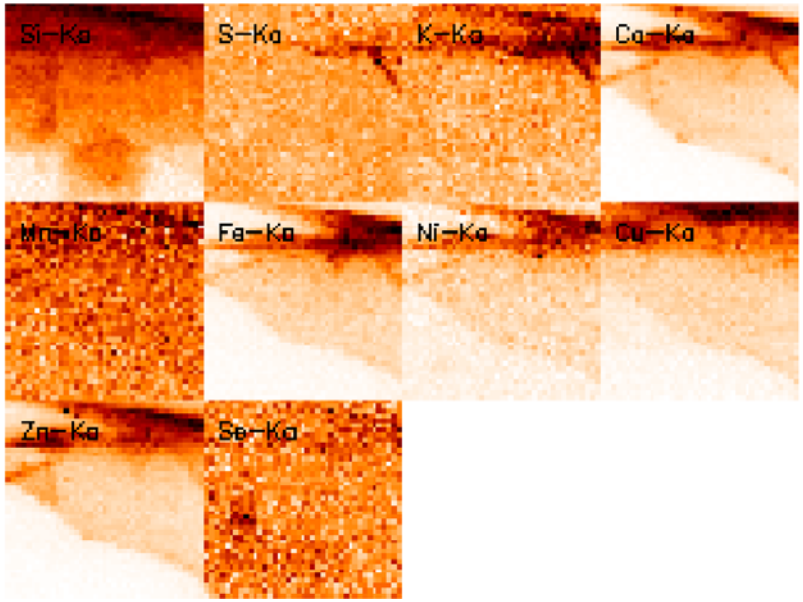
41 (0.5μm) x 41 (0.5μm)

LT 1sec

? S or Mo-L

fb01_63sum.ps

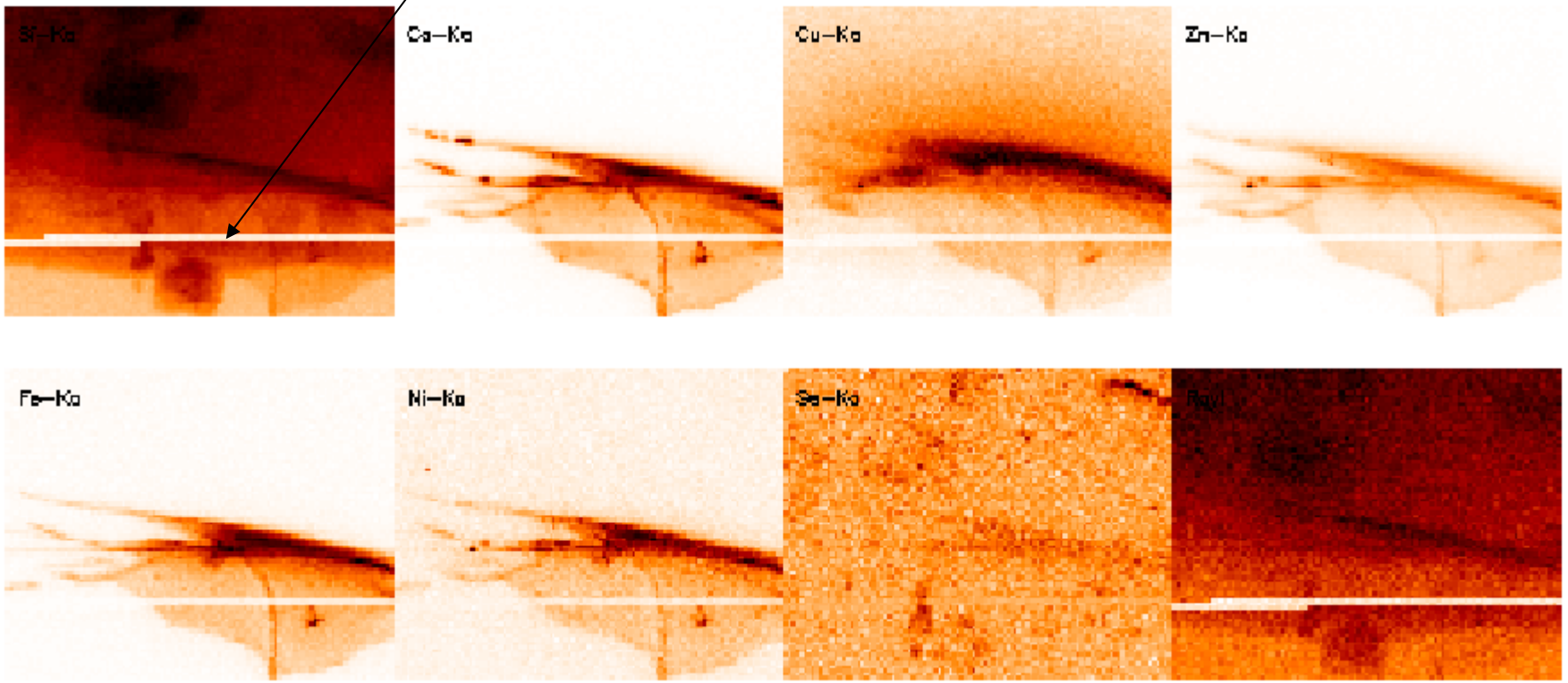




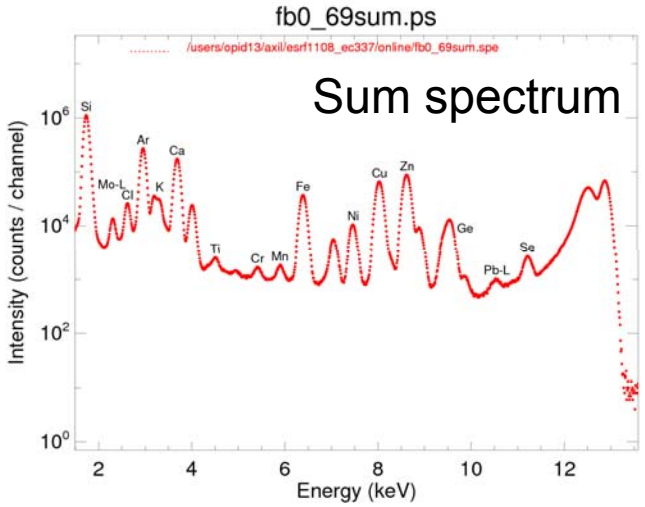
fb1_63i.ps (Pb collimator)

I1004,3,21,0,0

Injection



fb0_69i_c.ps



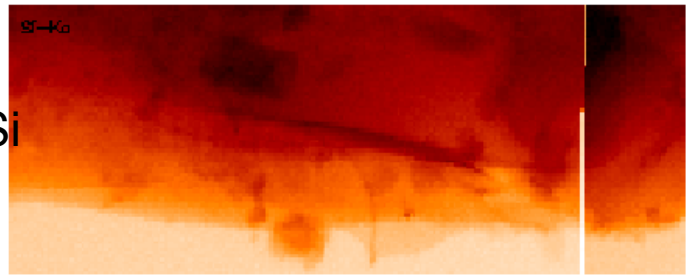
Scan 26

101 (0.5µm) x 81 (0.5µm)

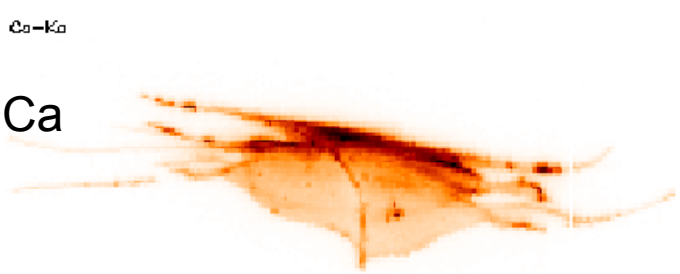
LT 1sec

I1004,3,21,0,0

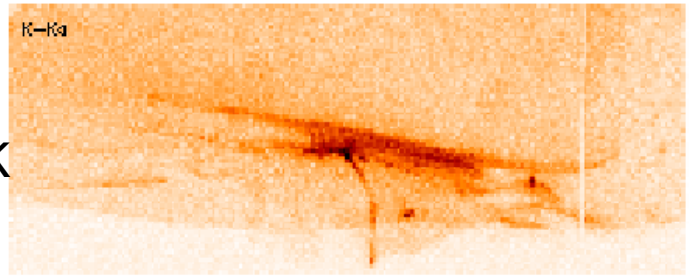
Si



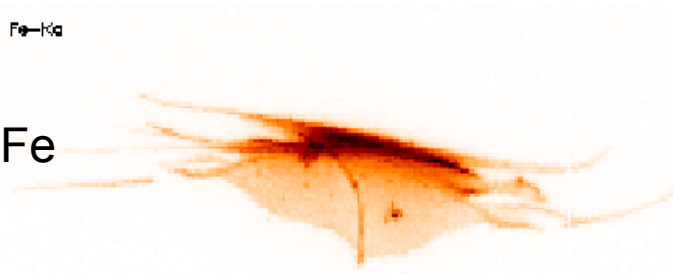
Ca



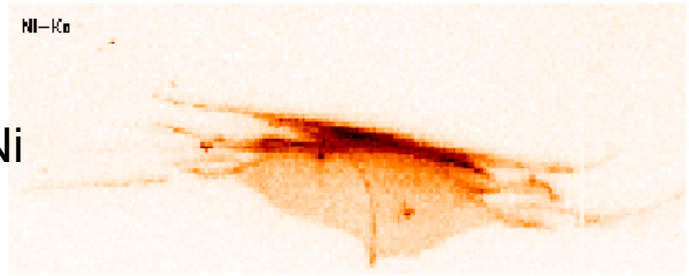
K



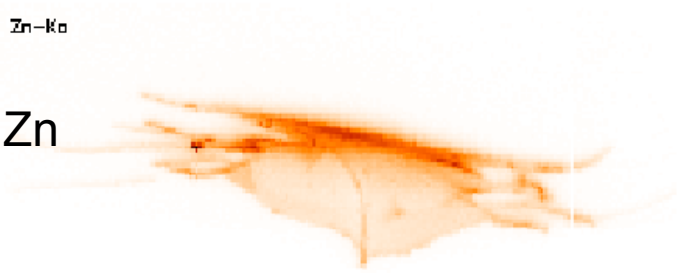
Fe



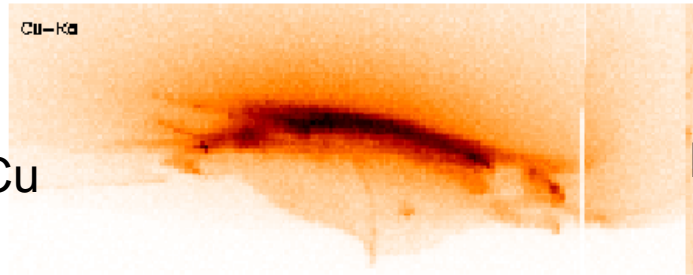
Ni



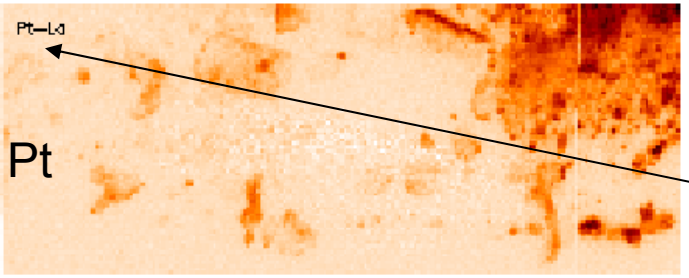
Zn



Cu



Pt

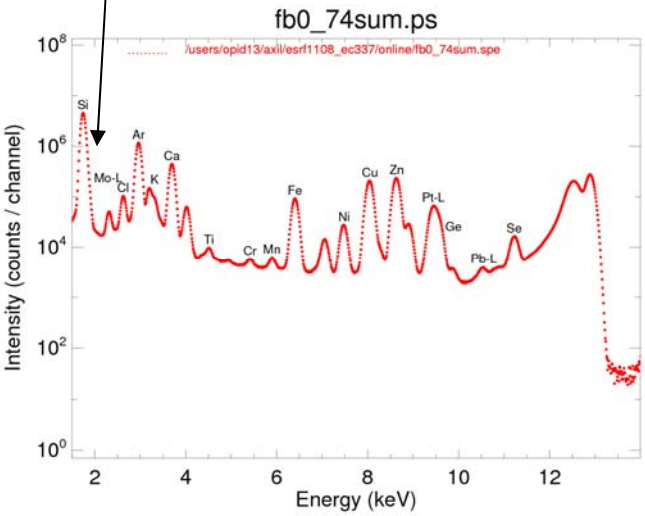


Scan 31

81 (0.5µm) x 201 (0.5µm)

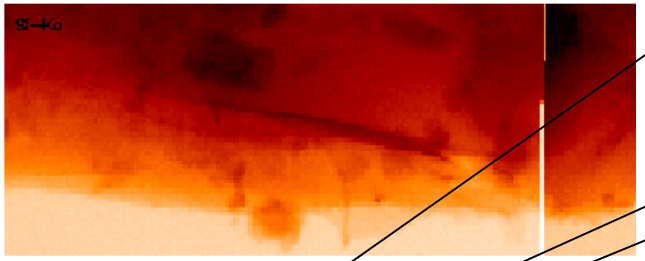
LT 2sec

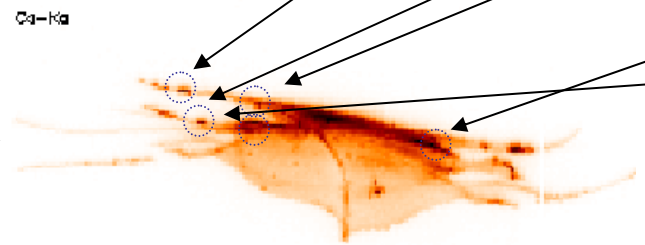
? S or Mo-L



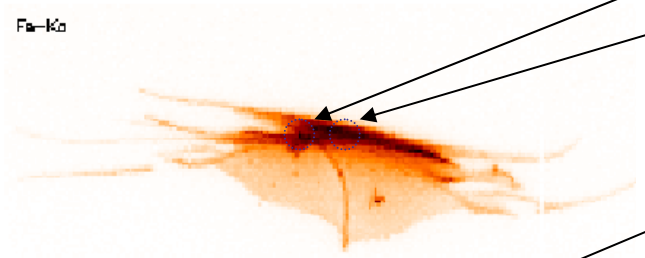
Contamination during preparation ?

I1004,3,21,0,0 point spectra

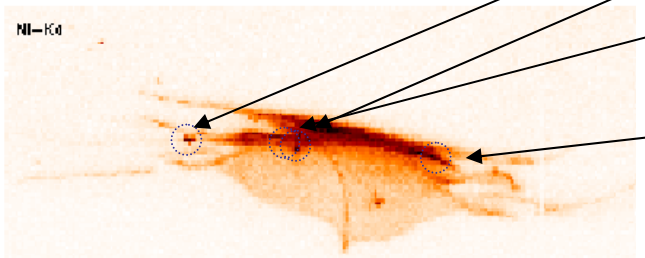




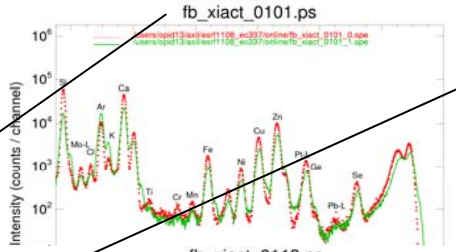
Ca

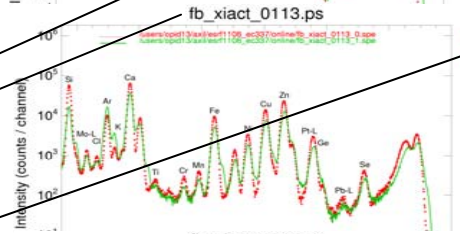


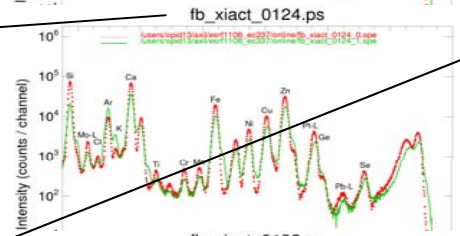
Fe

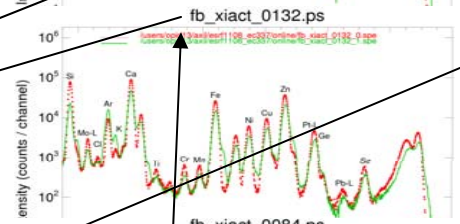


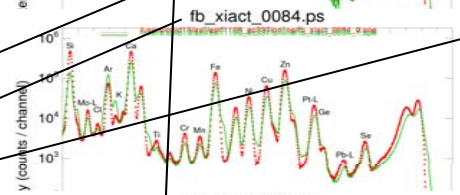
Ni

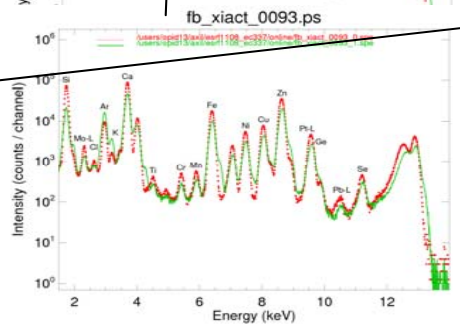


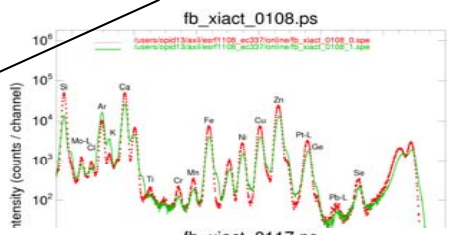


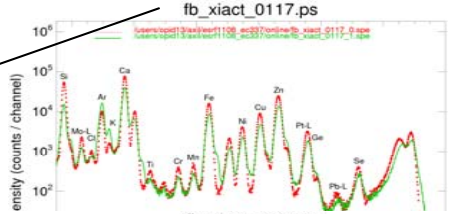


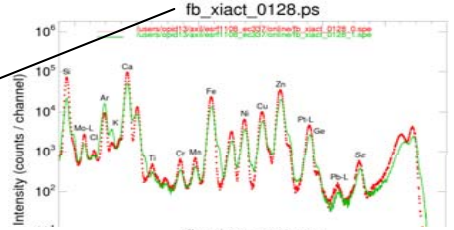


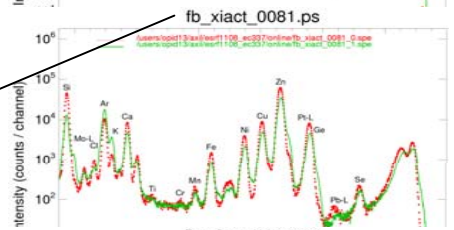


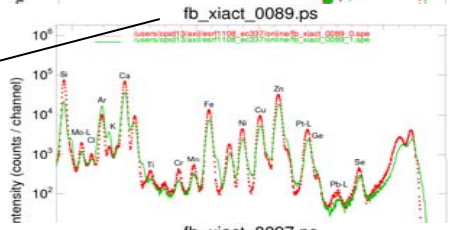


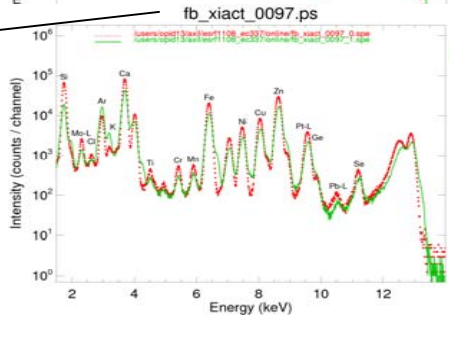












Dear Andrew, Bart and others,

the distribution of elements reminded me on one of the most impressive impacts of a particle from the cometary tray (see attachment). Could it be, that we have somthing similar, but on a much smaller scale? Andrew, do you have any data, figures from high speed impacts. I have heard about special features during these high velocity impact. If we compare the picture attached with the mappings it look indeed very similar. What puzzle me a bit is the composition with quite high Ca and K peaks. It is also not quite clear how we can explain Cu and Zn which was found as alteration in the cometary material? We should also think about the Aerogel composition. Bart, can you provide a sum spectra of the surrounding Arogel? Probably we can have a look at the measurements of the blank from our last beamtime. We should than think about the composition of compressed Aerogel. If we deal here with a small interstellar grain than probably the overwhelming part of the signal must come from condensed Aerogel.

Best, Frank

Frank et al.,

I agree that this is puzzling. We have essentially no information about the impacts at 20 km/sec into aerogel.
In fact, we are doing the best experiments done to date with Eberhard Grün et al. in Heidelberg literally right now -- my colleague Zack is there doing shots for three weeks.
I just received the first aerogel tile last Friday, and spent quite some time with it today under the microscope.
The projectiles were 10-25 km/sec latex spheres. The impacts do not look similar to this at all. Based on the K, Cu and Zn, this feature is not what we would expect from IS dust. Also the morphology in the x-ray maps is quite unexpected. On the other hand, it is not at all clear what it actually is. I have not seen features like this in the flight spare tiles.
Compression in the aerogel could produce a concentration of contaminants -- it would be interesting to estimate the amount of compression required to concentrate Cu and Zn to this extent. My guess is that it probably doesn't explain it, but it is worth doing the calculation.

The image that you attach is track 124, which is an unusual impact -- it first hit the aluminum foil next to the tile, the sprayed into to aerogel. I suppose that something similar might have happened here. We did an analysis on ALS beamline 10.3.2 of track 124 -- from this we could look at the concentrations of trace elements in the aluminum that accompanied the projectile into the aerogel, and see if we can see significant metals and perhaps K. (Although K would be unexpected in aluminum metal, apparently the foil was not as clean as one would have hoped before launch.) We will look at the track 124 data.

Best, Andrew