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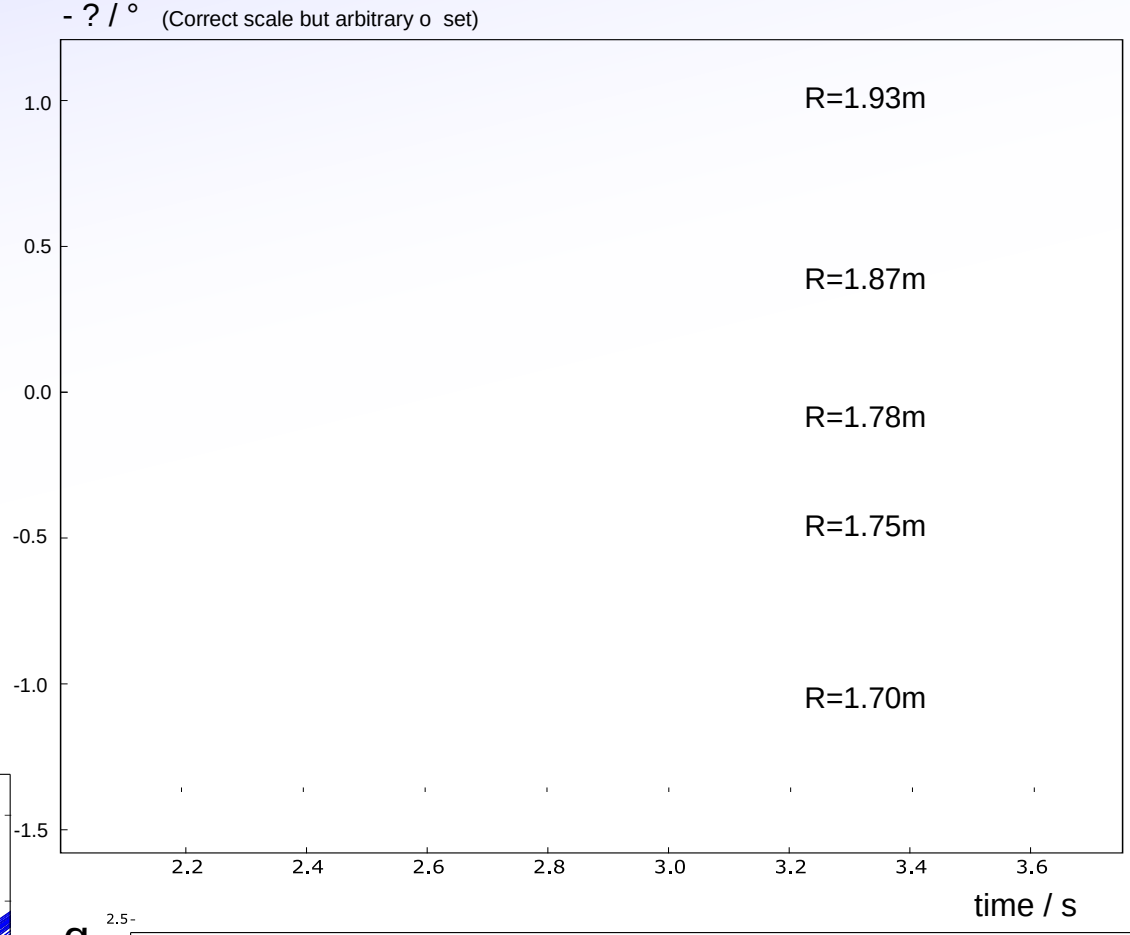
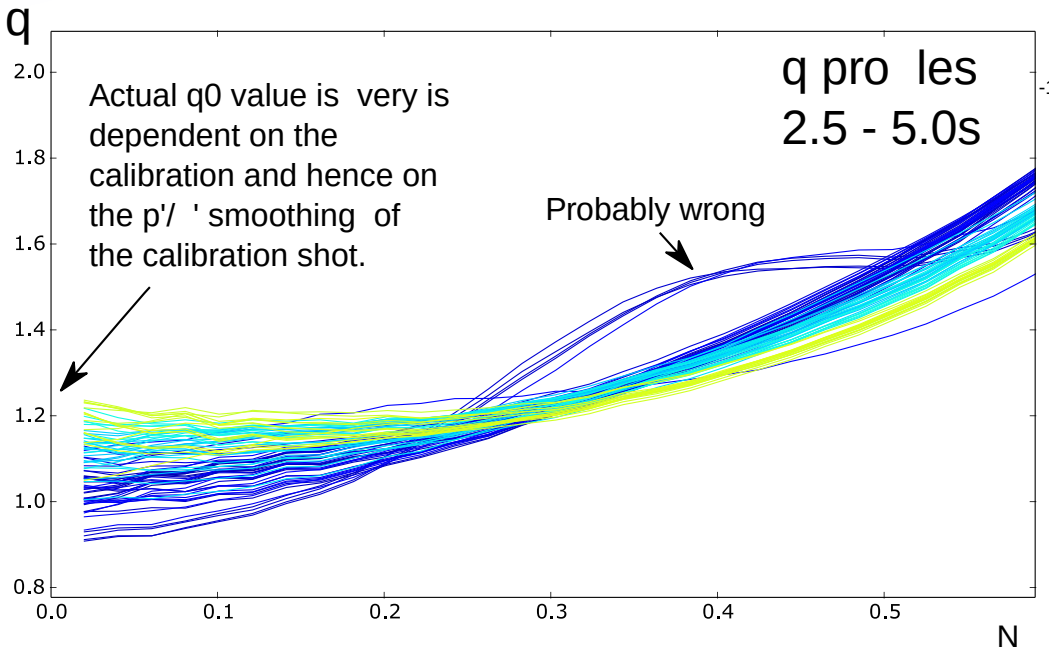
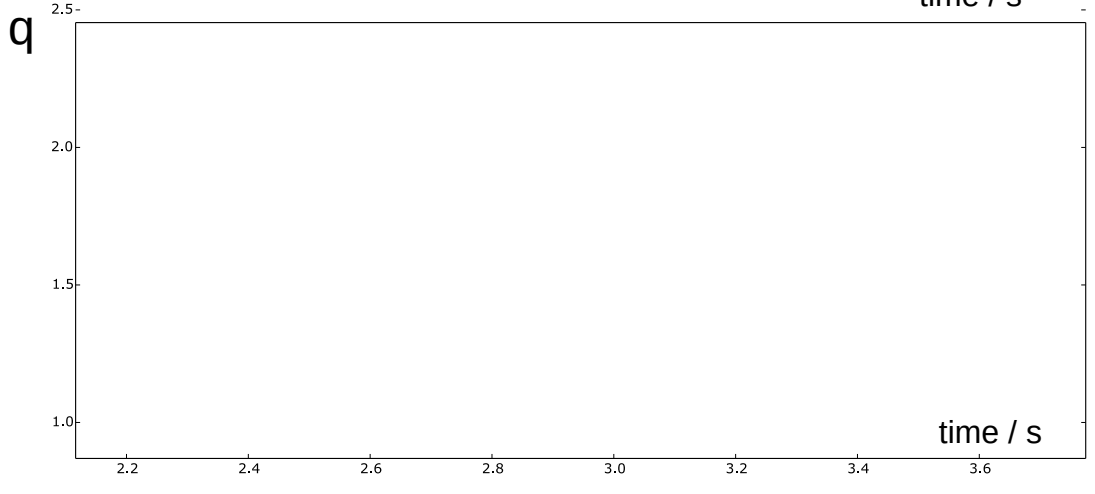
MultiCal for sawteeth

Using the calibration from MultiCal, we can then do a standard equilibrium from each time point using the IMSE data. The IMSE data/prediction see the sawtooth signature all the way to the edge of the plasma, with a ip of direction in the middle somewhere:







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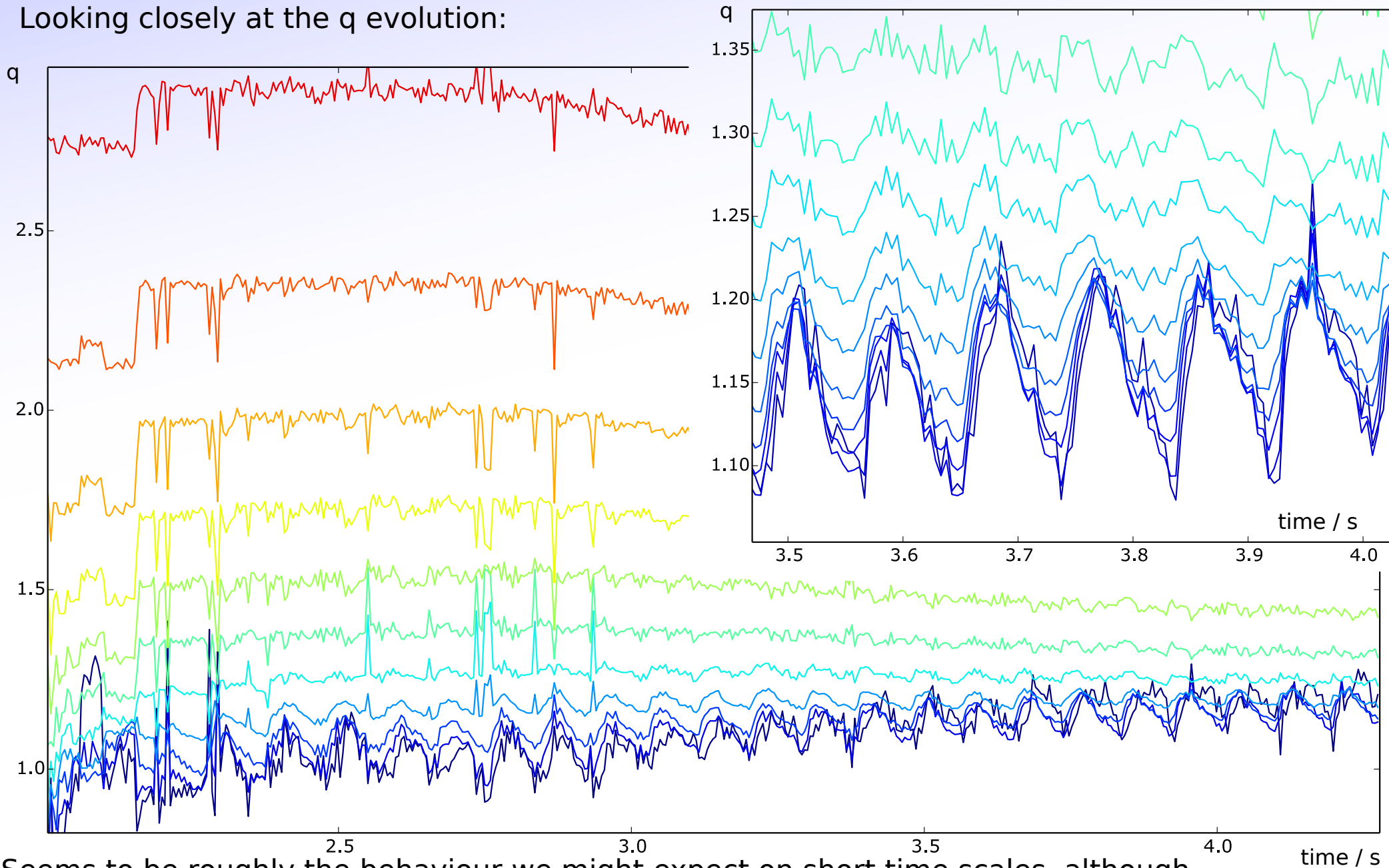
Looking closely at the q evolution:



Seems to be roughly the behaviour we might expect on short time scales, although the value and the gradual drift is not.

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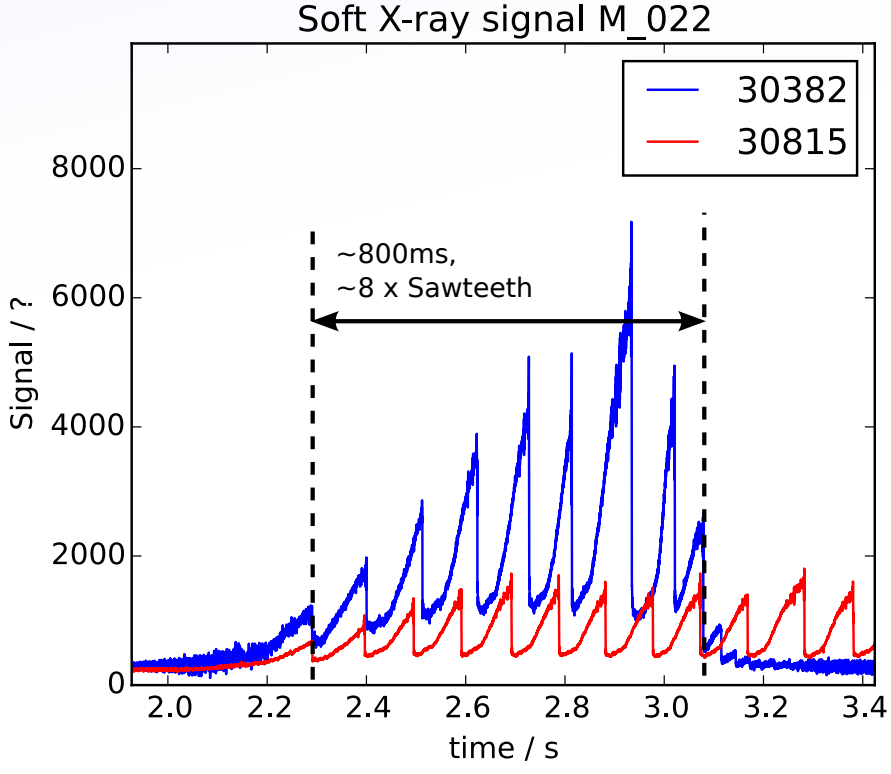
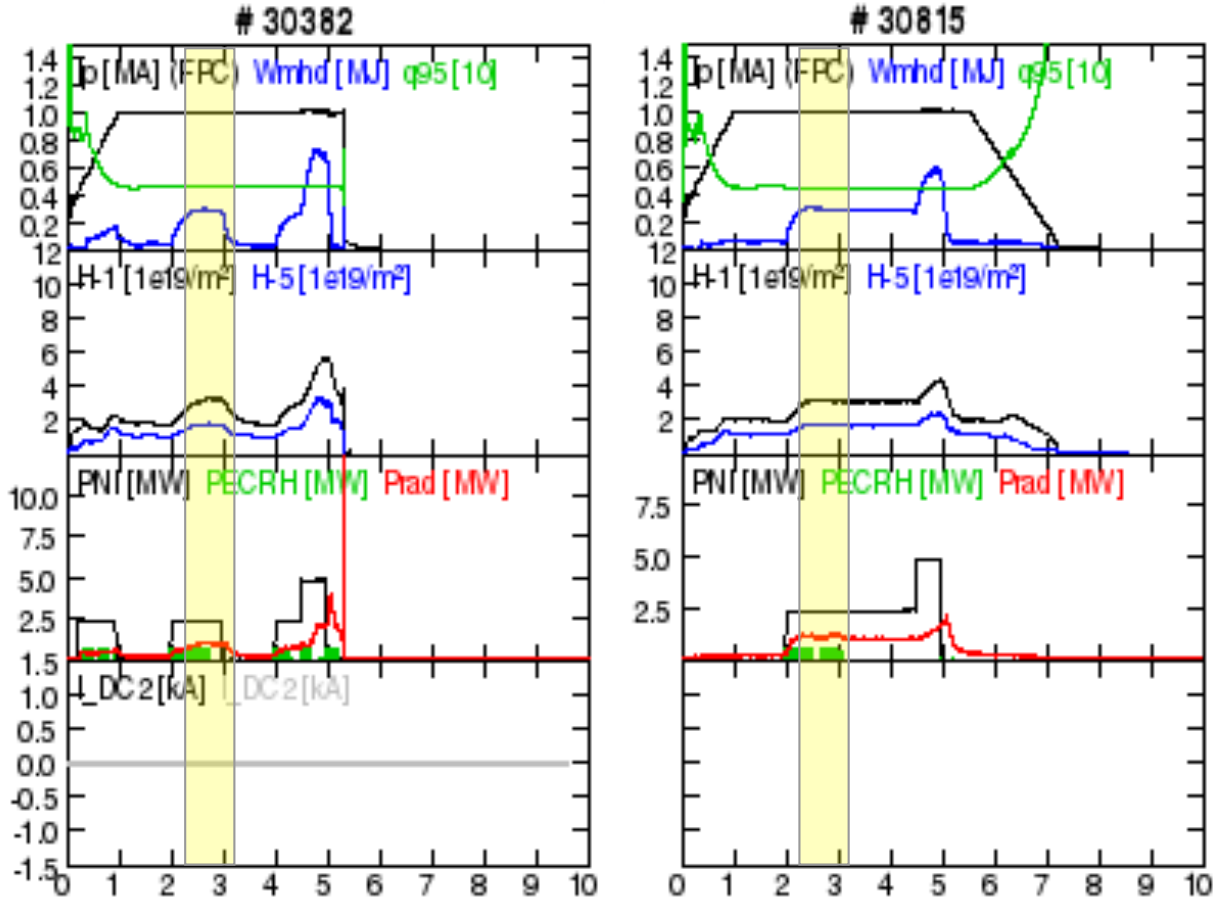
MSE/IMSE Sawteeth comparison

Trying to find a matching pulse for IMSE and MSE.

Best seem to be: MSE=30382 and IMSE=30815, 2.3s < t < 3.1s.
Sadly, 30382 doesn't have ECE.

From /sig/SXN/M_022 (random Soft X-ray signal), sawtooth period is dt = 90ms





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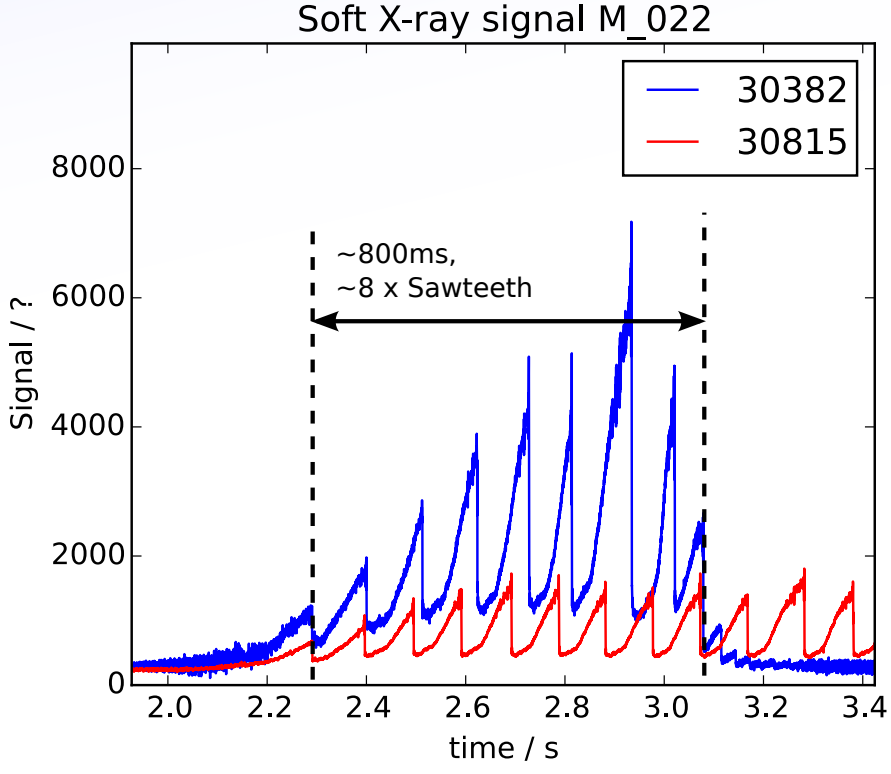

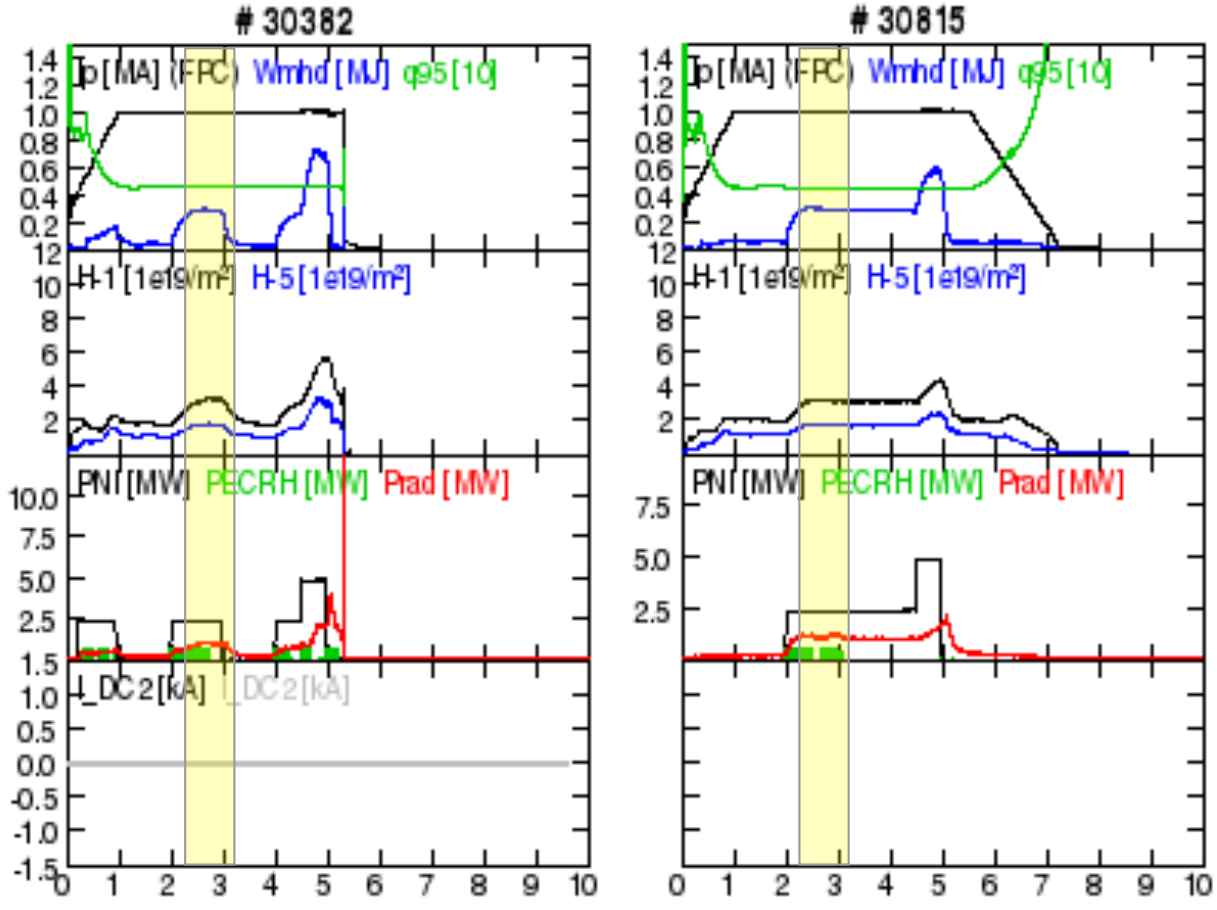

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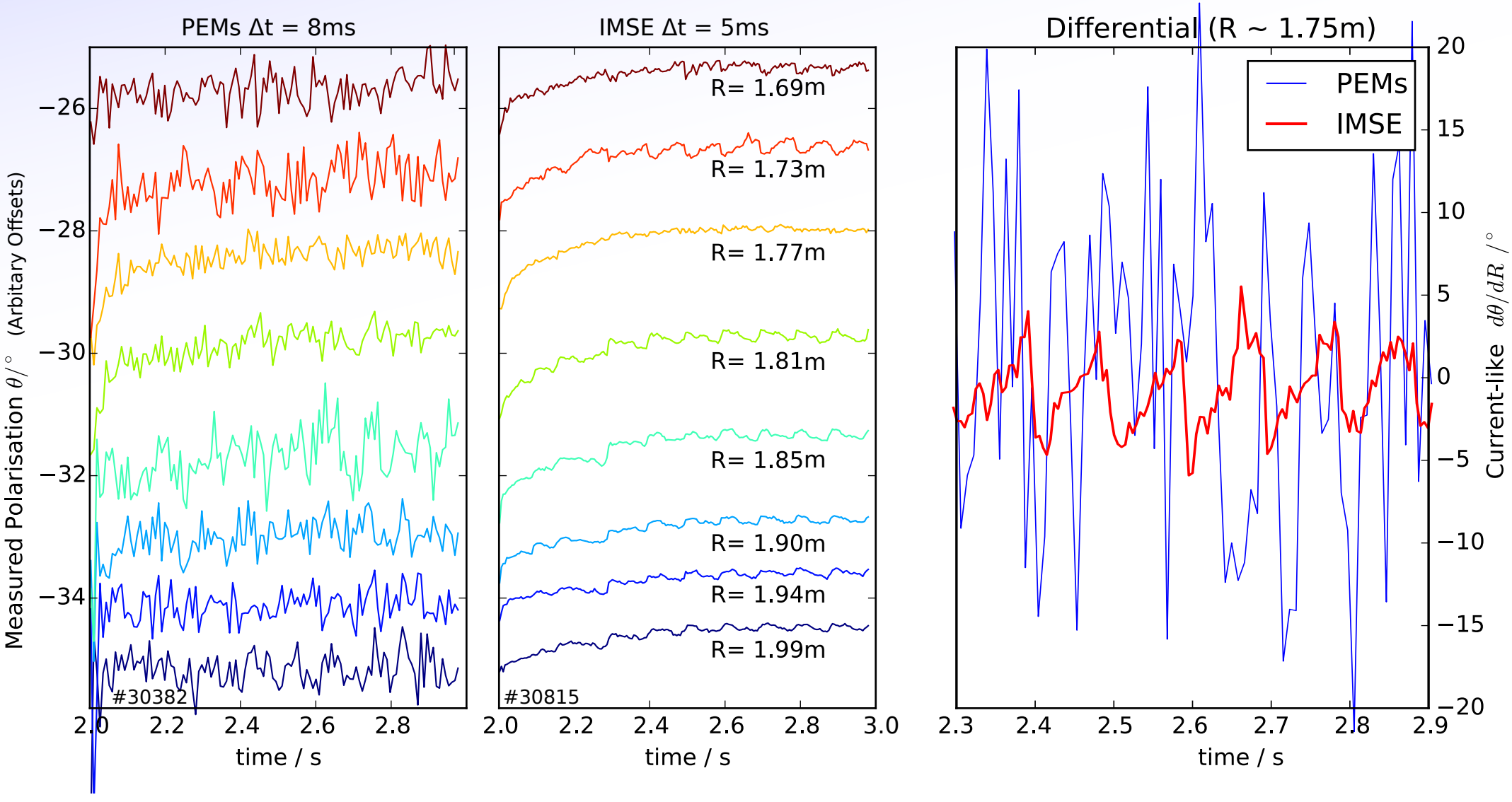

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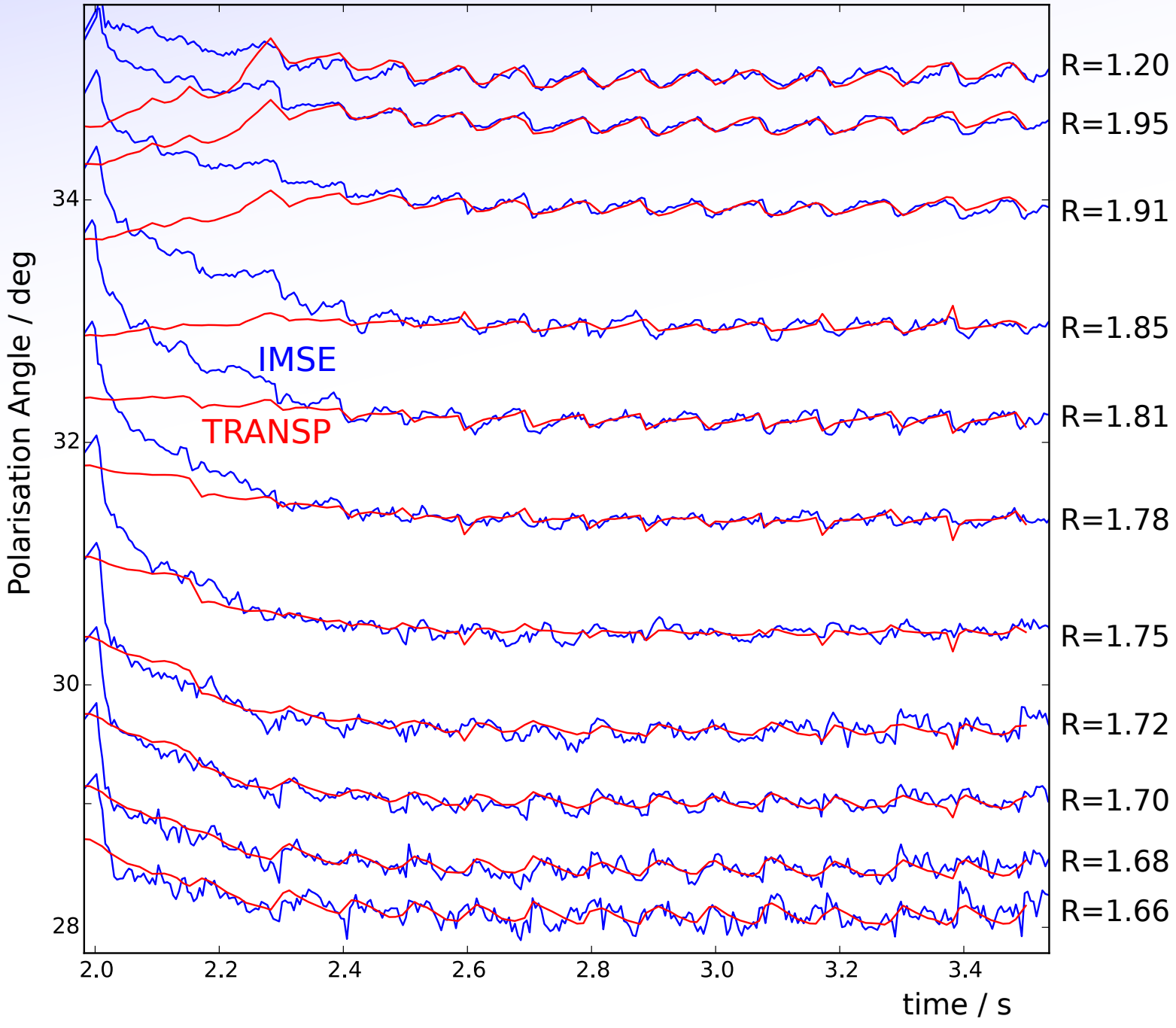
TRANSP comparison

Comparing with transp run for 30815 (with arbitrary offsets):



Prototype IMSE measured polarisation angle vs TRANSP prediction (B.Geiger)
Offsets adjusted to match average in 2.5 < t < 3.5s
Shot 30815.

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PermIMSE - Sawteeth

Attempted to measure the sawteeth shots on Tuesday with the IMSE since this had worked well with the prototype system, except that it couldn't see to the core.

Use reduced ROI (for Q8 only), dropping frame period to 7ms (normally 13ms).

32566: Good - Irregular sawteeth but clear data.
32568: Q8 tripped.
32569: 3 Sawteeth only.
32570: Camera failed, and no Sawteeth with Q8.
32571: No sawteeth.
32573: No sawteeth (intentionally)
32574: No Q8

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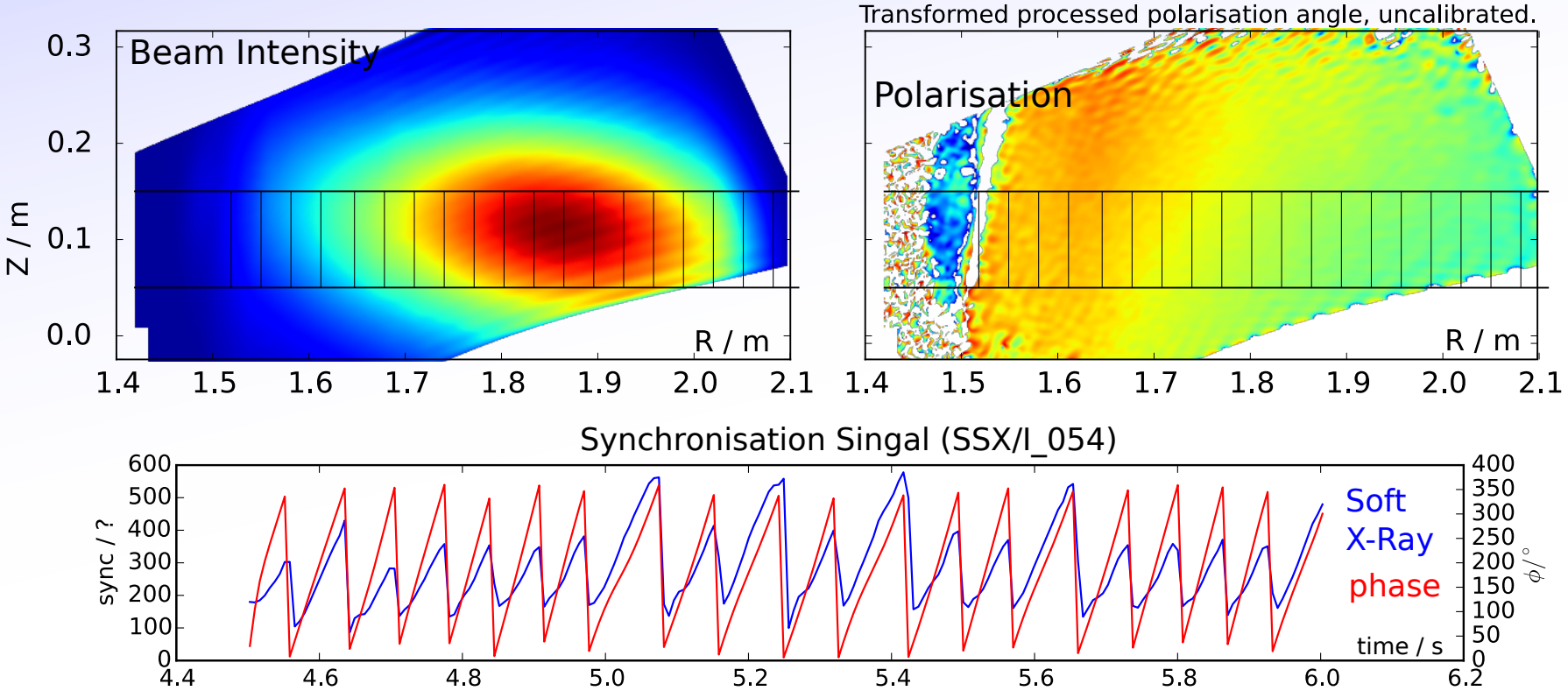
PermIMSE - Sawteeth



To first approximation in the core, the plasma current goes as dθ/dR.

- Collect image dθ/dR in bins of R and sawtooth phase
- Average in bins (over R, Z and t)
- Subtract average for each R bin to show the dynamics over sawtooth phase.

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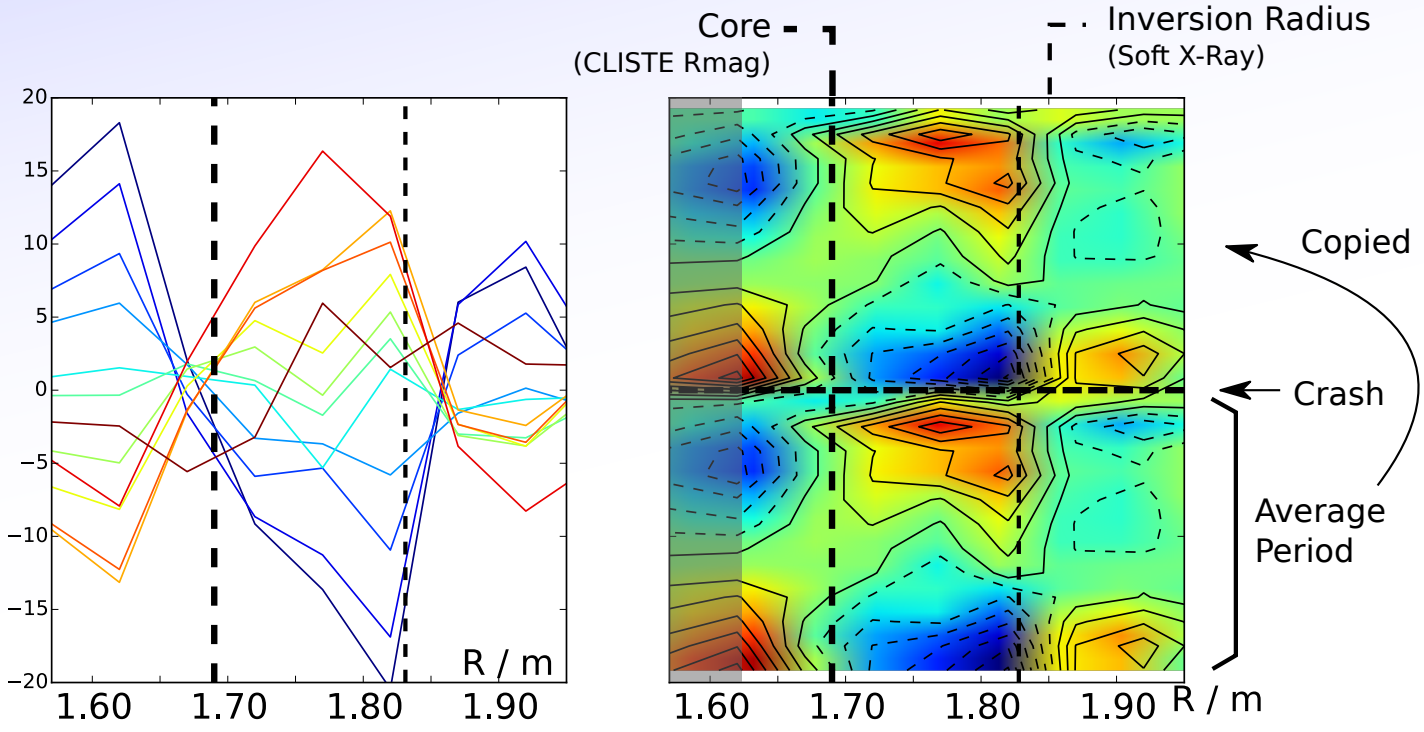
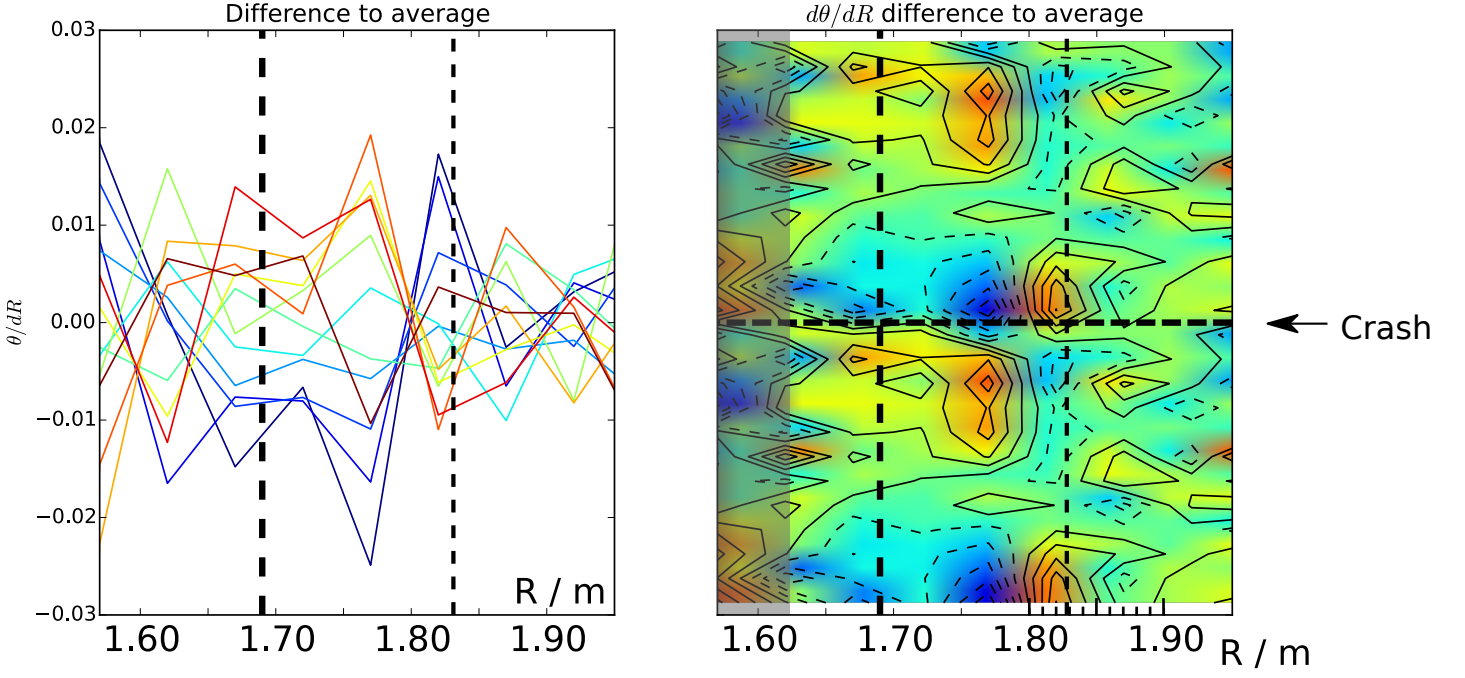
PermIMSE - Sawteeth

Gradient of intensity (~ dn_e/dR) shows us that our spatial calibration matches the approximate core position and inversion radius from ECE.



Gradient of polarisation ($d\theta/dR \sim j\varphi$) gives current dynamics.

Clearly see the build-up and explusion of current from the centre outwards.