

AUG Monday Morning Meeting 20/07/2015

Permanent IMSE 2015 - First Results

Ex-vessel Installation
First Data

O. P. Ford,¹ A. Burckhart¹

1: Max-Planck Institut für Plasmaphysik, Greifswald/Garching, Germany

Permanent IMSE - Ex-vessel Installation

IMSELAB/23 - 28

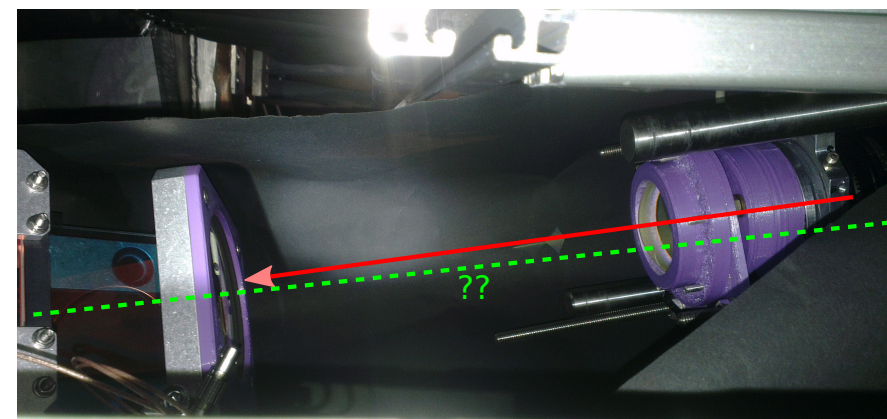
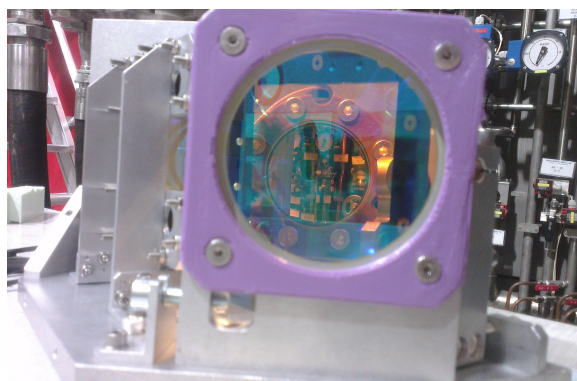
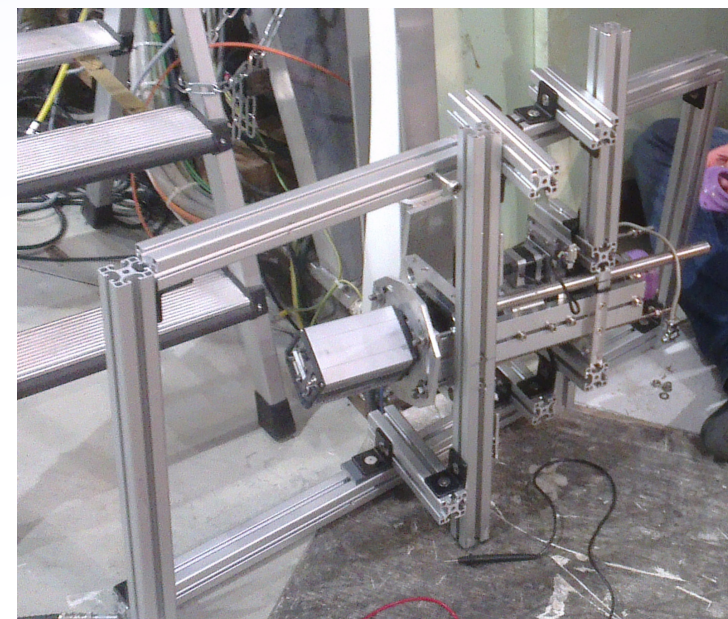
Wednesday 15th July 2015: Installed the ex-vessel optics and support structure for IMSE back-end in Sector 9.

- Prototype IMSE back-end (2013/14).
- Lots of 3D printed parts.
- Temporary support structure.

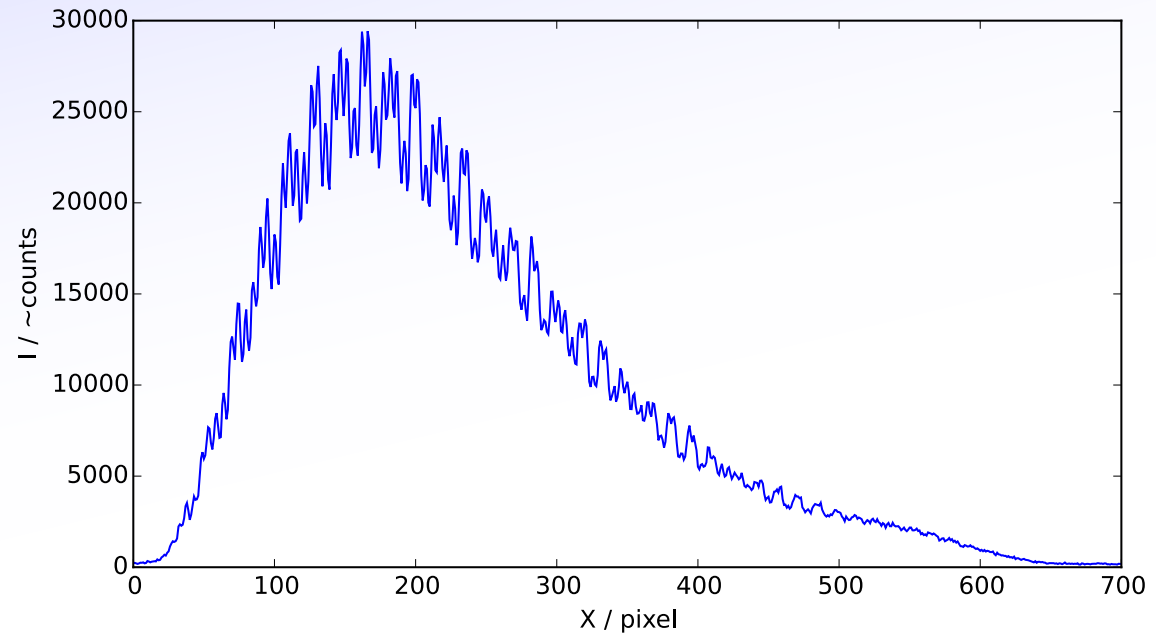
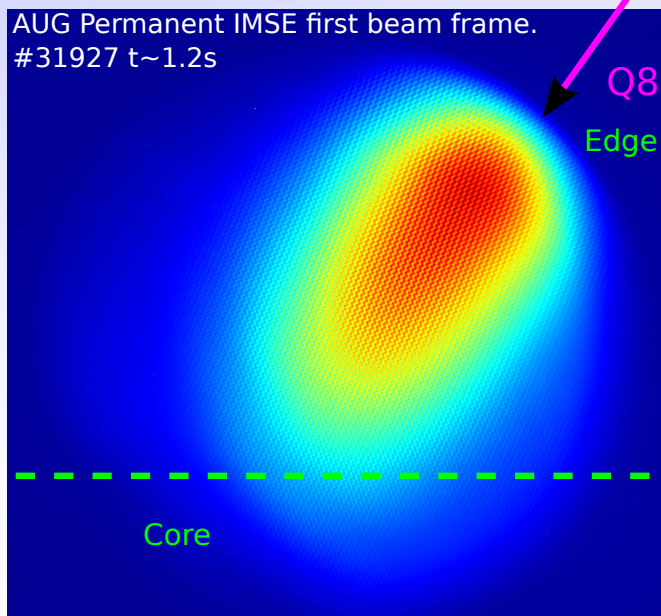
Only enough time to install, so:

- No optics alignment.
- Arbitrary focus setting.
- No filter optimisation.
- No internal linearity calibration.
- No polarisation alignment.
- No control systems (focus, filters, polariser)
- No trigger (post-processed timing only).
- Borrowed optic fibres from MSE ex-vessel calibration.

Didn't expect much more than seeing some light!



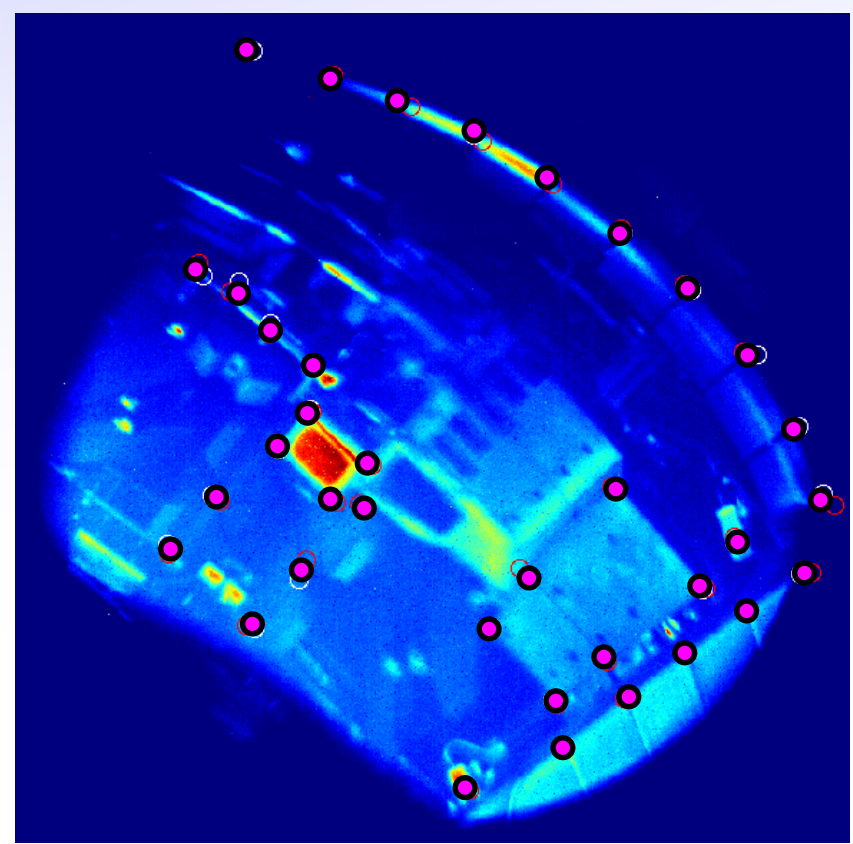
First Light



- Good beam image, about the same light intensity as prototype IMSE.
- Much wider FOV.
- Better beam penetration (higher energy beams).
- Good fringes (S/N) - should get even better with filter optimisation.
- Very lucky choice of orientation - plasma in best operating range!

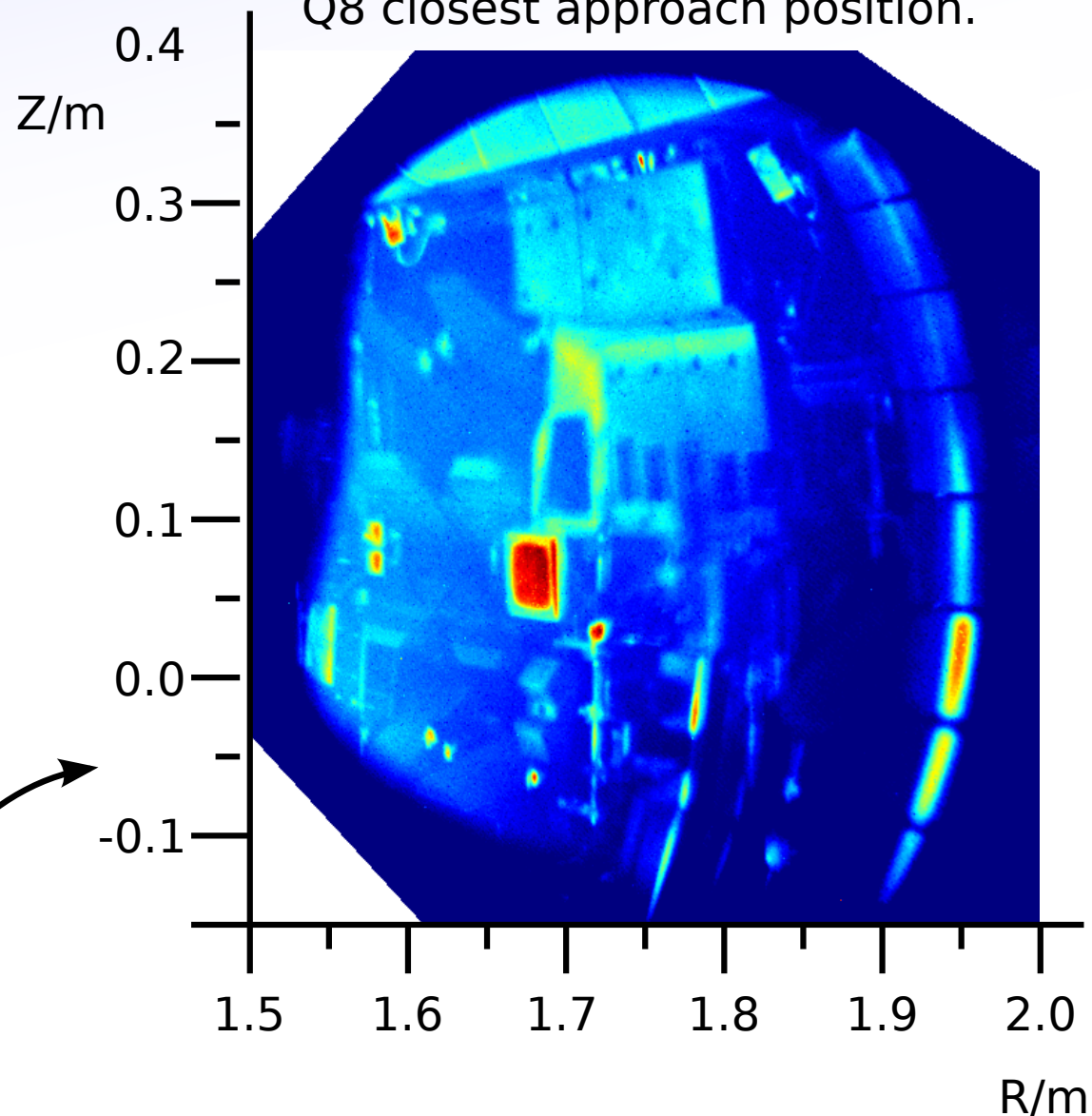
Field of View

Transform gives us automatic spatial calibration, and tells us our field of view:



+
~40 FARO
Measurements

Q8 closest approach position.



Much better FOV - should be able to see past core when beam penetration is good.

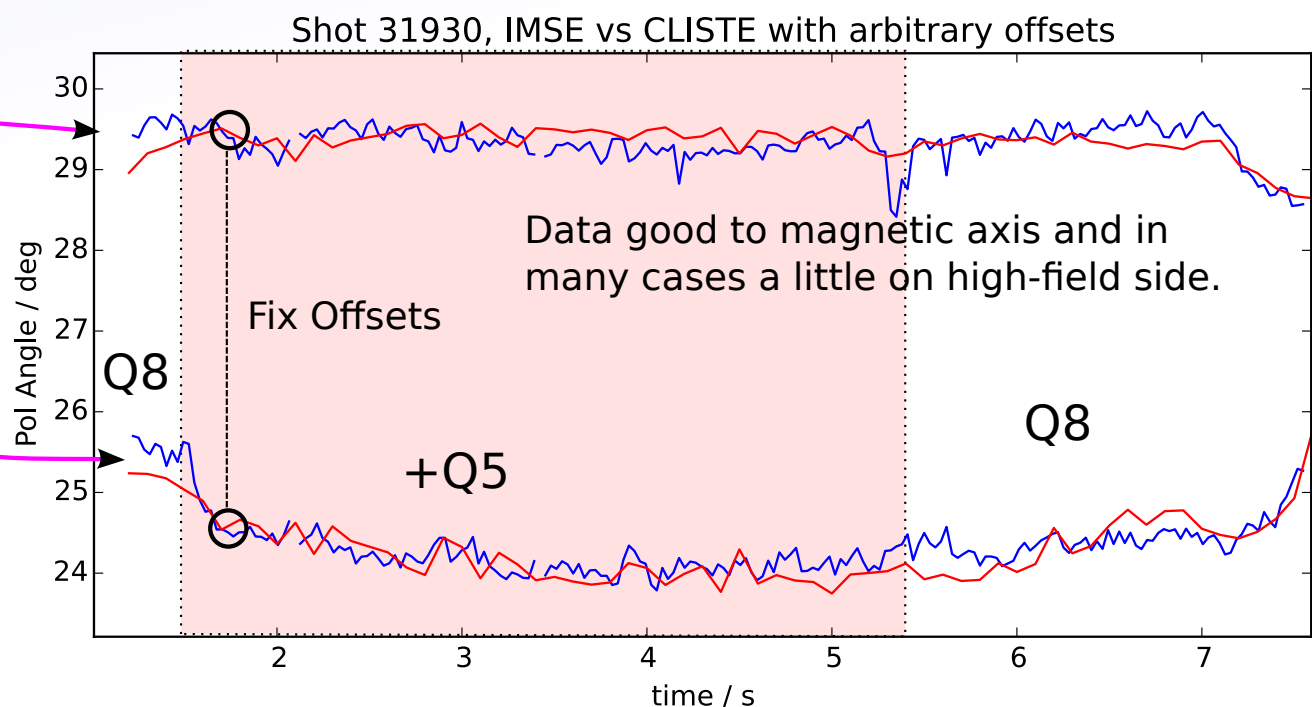
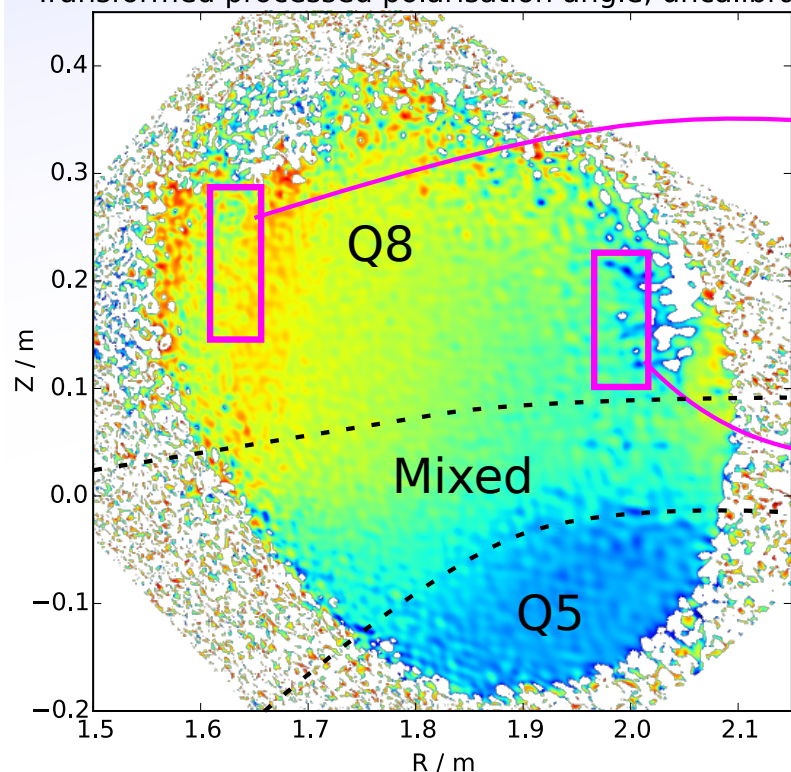


Match to equilibrium

The IMSE has the usual offsets and spatial deformations that need to be calibrated (will be done next week), but we can already look at first order comparison to CLISTE:

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Transformed processed polarisation angle, uncalibrated.

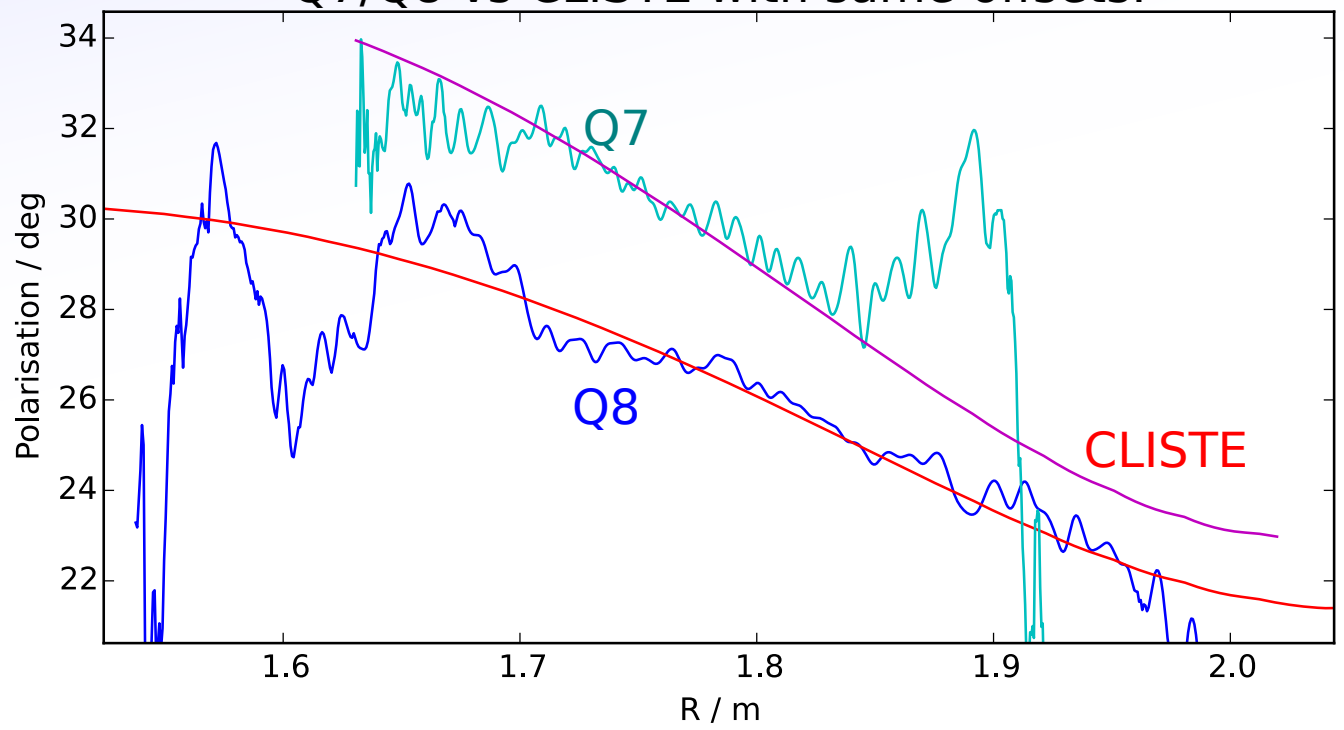
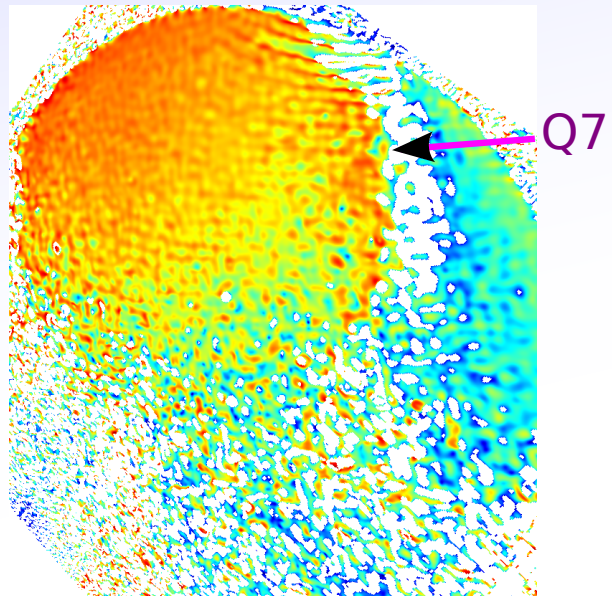


Data is good quality within at least $1.6 < R < 2.05\text{m}$, possible down to 1.556m .
Data crossing the magnetic axis is most important for constraining the equilibrium.

Current drive beams

Data is also good quality for Q7.

Q7/Q8 vs CLISTE with same offsets.



Switching between Q8/Q7 shows the expected angle jump due to beam geometry.

We can use Q8, Q5 or Q7 and a lot of the image area is useable for Q5+8 configuration. There may be some Er info in the mixed Q5/8 configuration.