SP F monitoring meeting

Progress in the multichannel broadband spectrometer commissioning for TOMAS plasma characterization

M. Sackers, M. Klein, O. Marchuk

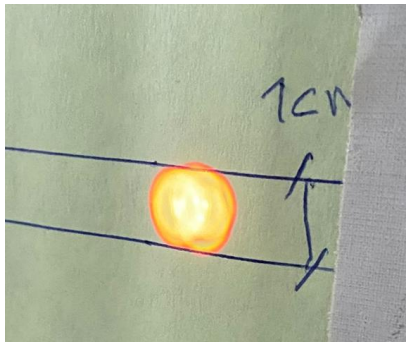
FZJ

This work has been carried out within the framework of the EUROfusion Consortium, funded by the European Union via the Euratom Research and Training Programme (Grant Agreement No 101052200 — EUROfusion). Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them.

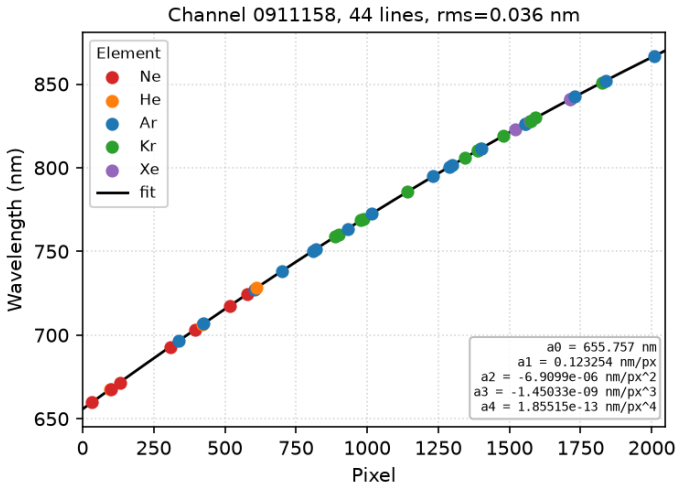
Calibration

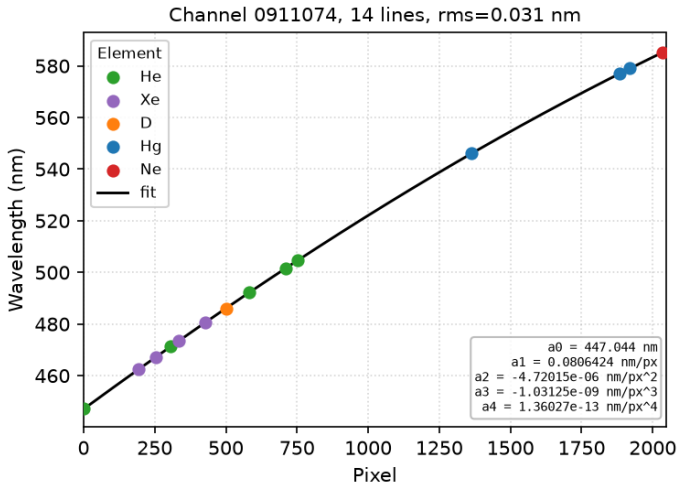
COL-UV/VIS-25

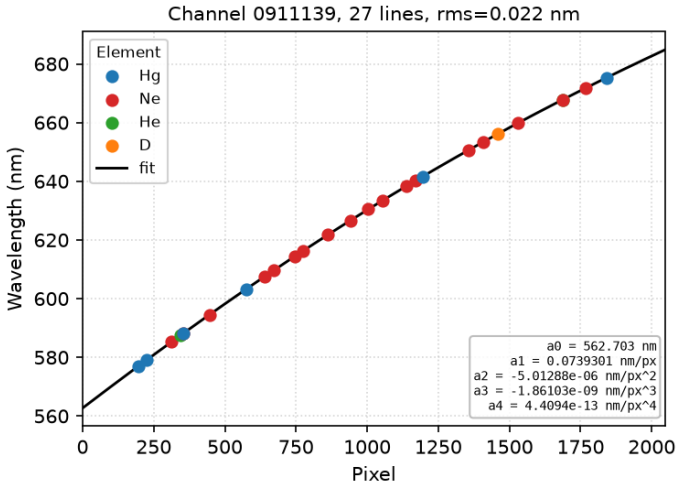


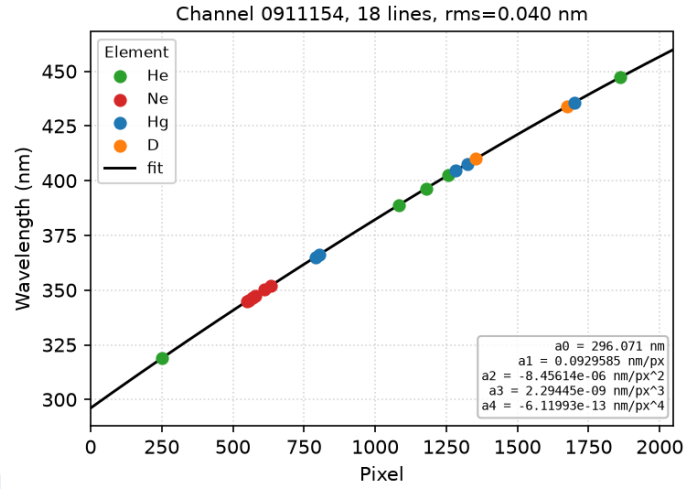


Collimator focus adjusted to ~ 1 cm









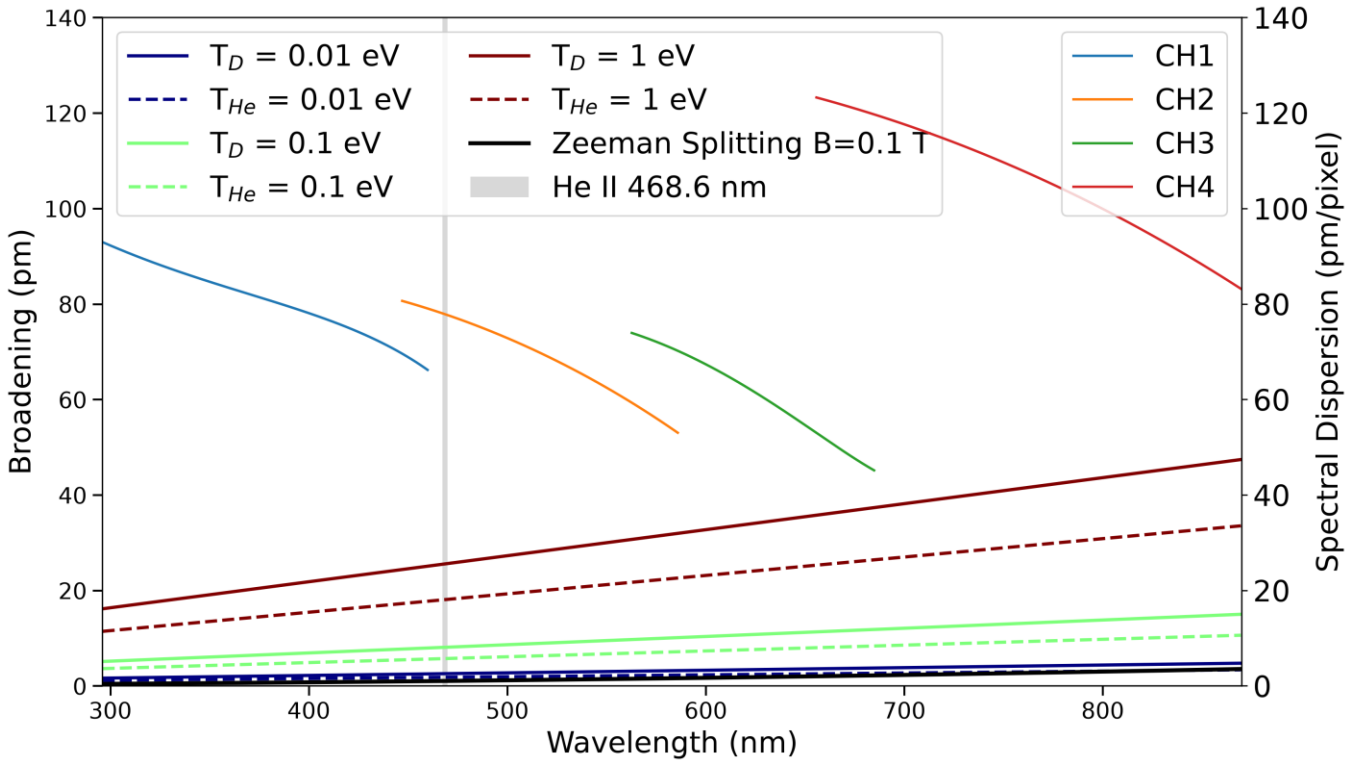
Ion temperature measurements

Doppler broadening:

$$\Delta\lambda_{\mathrm{Doppler}} \approx \lambda_0 \left(\sqrt{\frac{8\ln(2)\,\mathrm{k_B T}}{\mathrm{m\,c^2}}} \right)$$

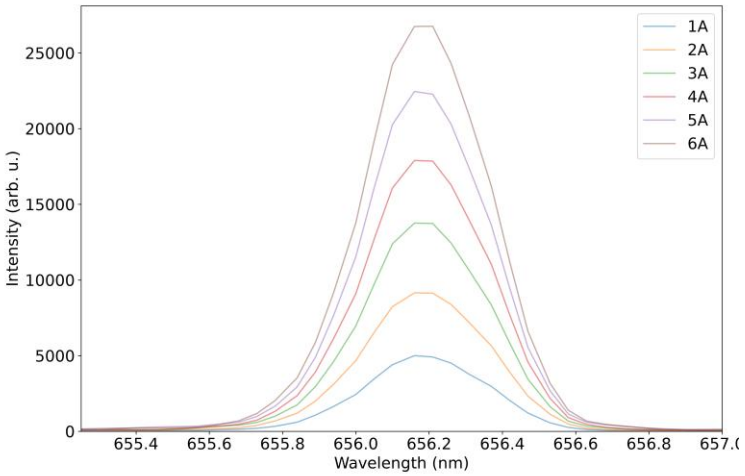
Zeeman splitting:

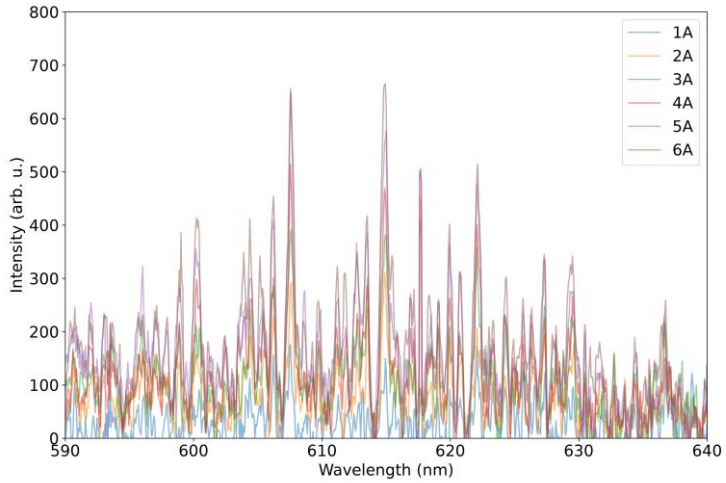
$$\Delta\lambda_{\mathrm{Zeeman}} \approx \frac{\lambda_0^2}{c} \cdot \mathrm{B} \cdot 14\,\frac{\mathrm{GHz}}{\mathrm{T}}$$

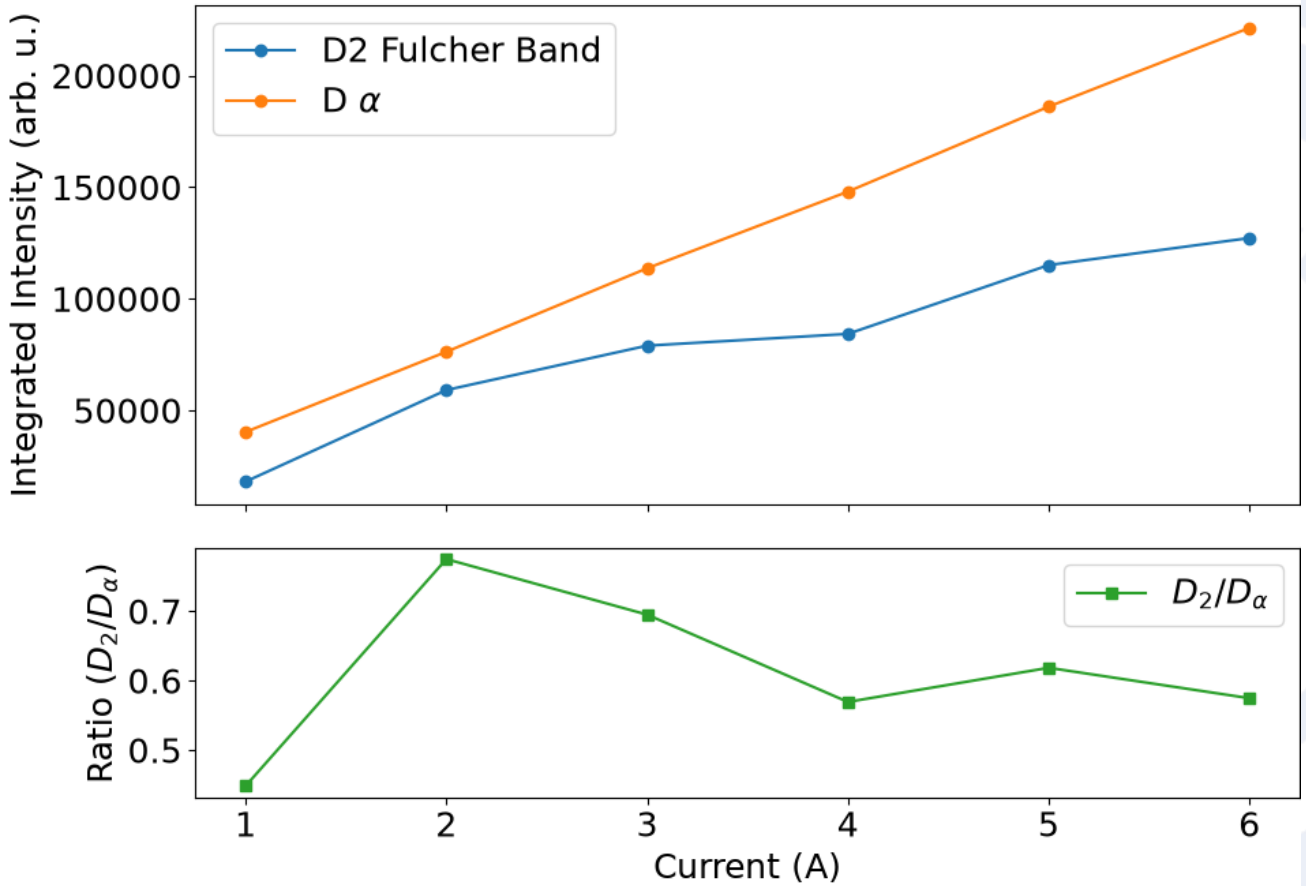


➔ **Broadening below the limit of detection**

Dissociation degree in deuterium glow discharge

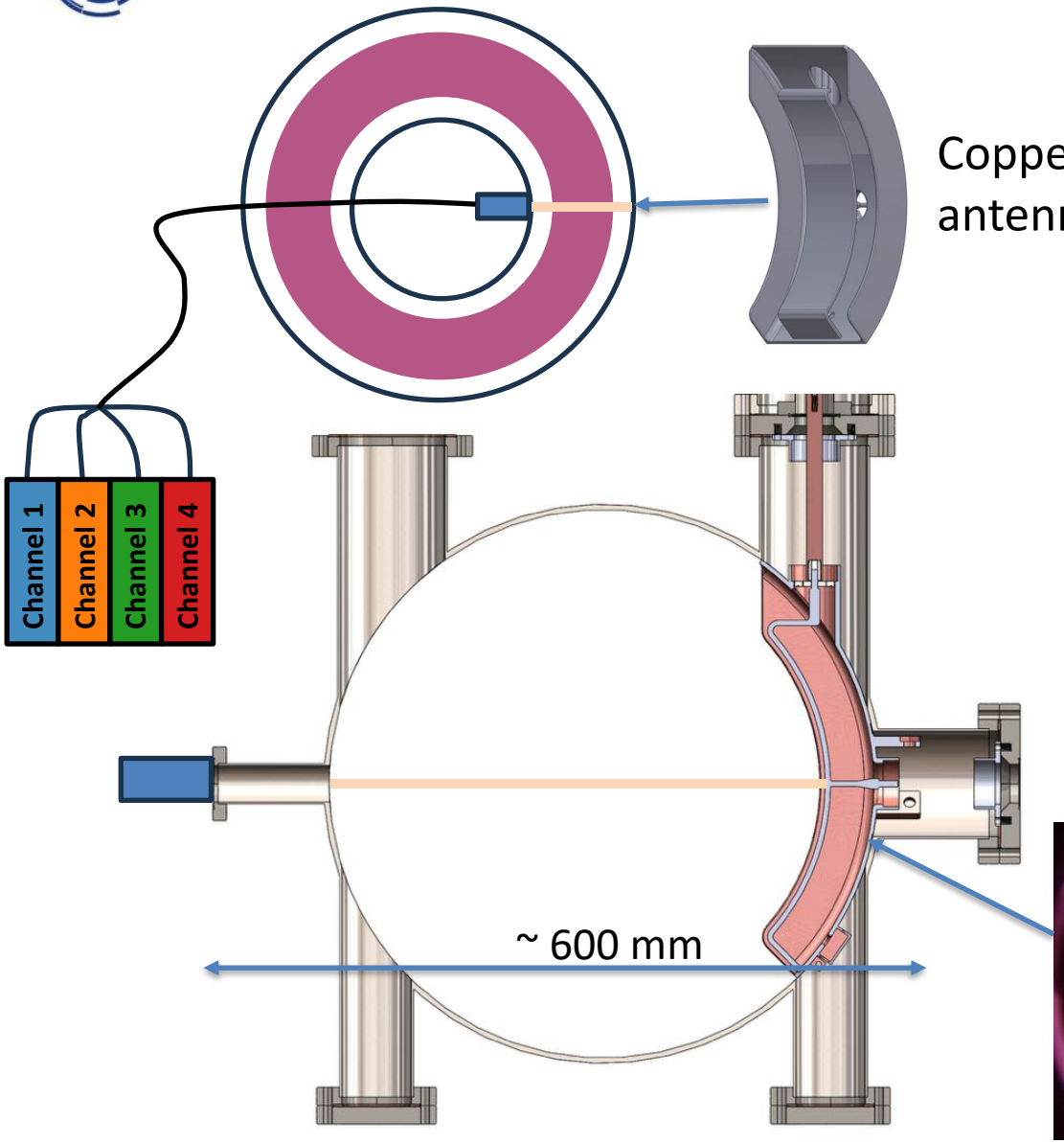




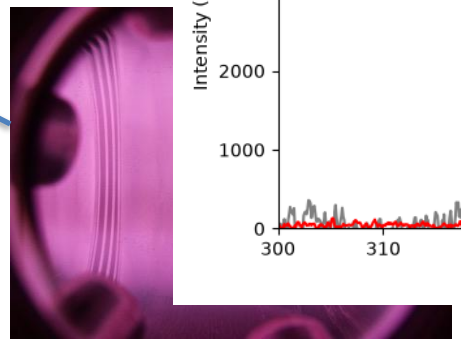


➔ **Further interpretation depends on plasma parameter scaling on GD current and requires radiometric calibration**

Erosion of the ICRF antenna



Copper ICRF antenna



Emission spectra: He GD and ICRF

