

IPPLM Contribution to the WEST Project

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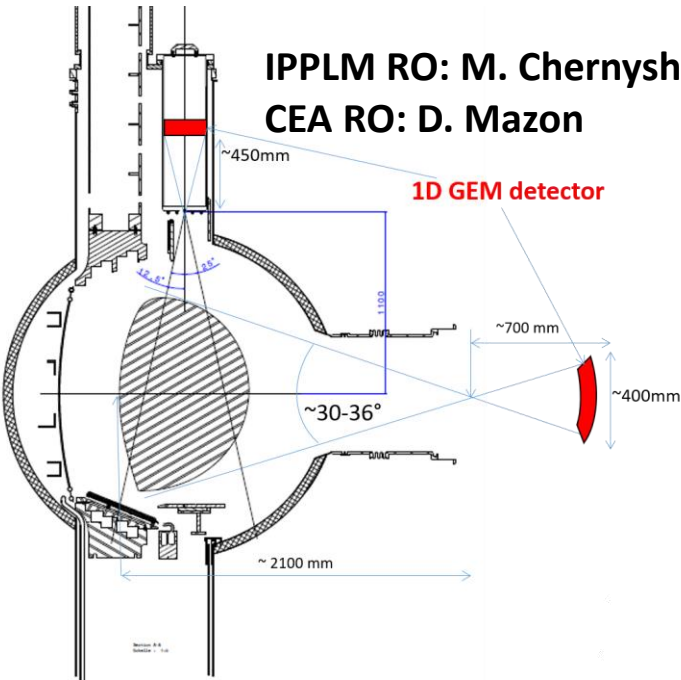
WARSAW UNIVERSITY OF TECHNOLOGY



**NATIONAL CENTRE for
NUCLEAR RESEARCH**
Świerk

Tomography system based on GEM detectors for observation of tungsten radiation

IPPLM RO: M. Chernyshova
CEA RO: D. Mazon



Status

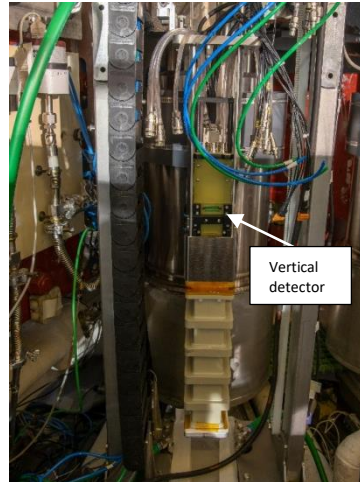
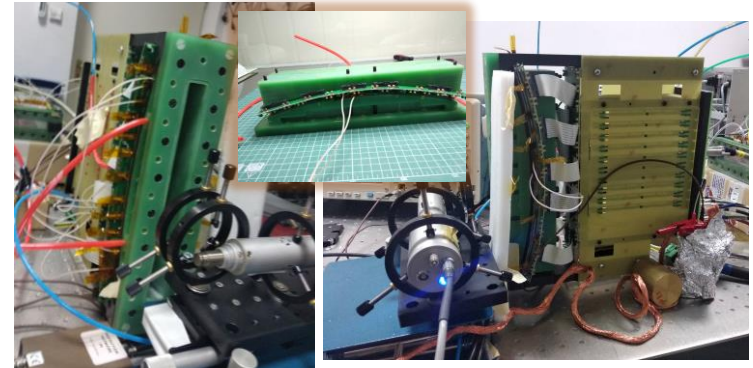


Photo of installed diagnostic system with the GEM detector before putting it into the vertical port.



Photos of the horizontal detector during the tests at IPPLM laboratory.

Vertical detector:

- Installed and tested in December 2018 during the WEST campaign

Horizontal detector:

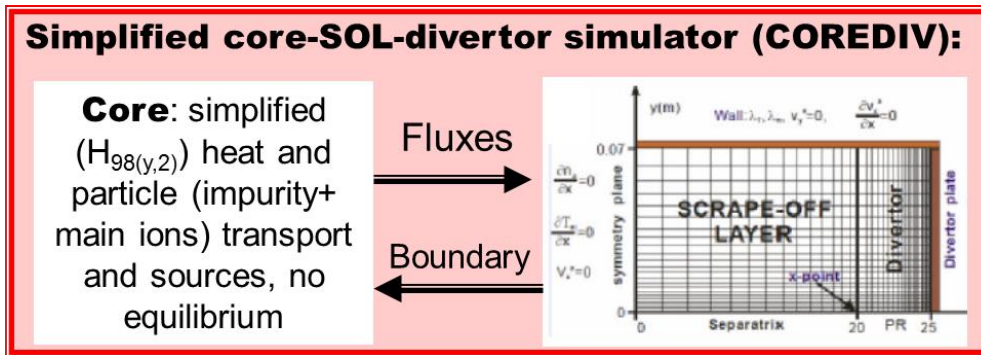
- Ready for operation
- Already manufactured, tested at IPPLM
- Ready to be delivered for complete tomography

Future plans:

- Tests and data analysis during upcoming WEST campaigns within WPPFC project and under agreement on collaboration between IPPLM and CEA
- Further development of the diagnostics performance (elimination of parasitic signals, further data processing development, etc.)
- Supporting the IRFM local team to have the diagnostic operational when requested by the experimental program and providing valid measurements
- Providing adequate initially processed data for subsequent physics analysis of the soft X-ray measurements
- Study of impurity content in particular W, impurity distribution reconstruction

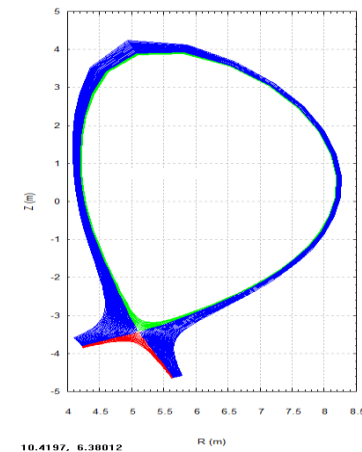
Future plans and capabilities cont.

- **Participation in WEST experiments and data analysis** - spectroscopic analysis of impurity behaviour in various plasma conditions (VUV, VIS, soft X-ray)
- **Numerical studies** of the influence of different impurities (He, C, O, N, Ne) on the W production and comparison with experimental data, focusing on:
 - ❖ Determination of the W divertor source, as a function of plasma temperature and impurity composition
 - ❖ Material migration studies (W, low and high Z impurities)
 - ❖ Assessment of the impact of RF heating on W source



COREDIV code

TECXY code



- **New diagnostics developments:**
 - ❖ Application of GEM detector for 2D single detector imaging;
 - ❖ 3D tomography of multiple GEM detectors
 - ❖ Study of fast electrons with Cherenkov-type detectors