JHU diagnostic plans for 2009-2013

Plasma Spectroscopy-Diagnostics Group
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Presents: D. Stutman

Existing and planned diagnostics

Existing

- USXR and OSXR multi-energy (ME) arrays for fast T_e (n_e, n_z) in the core
  - electron and impurity transport
  - MHD perturbations (ELMs, EPMs, RWM)

Planned

- High-resolution tangential ME-SXR array for the pedestal (08-09)
  - pedestal, ELM physics
  - 'active' ELM control proposal (Stutman, Boundary meet.)

- Multi-energy VUV arrays for fast, 2-D divertor diagnostic (09-13)
  (to be prototyped within the Advanced Diagnostic program)
  - total and spectral radiated power
  - T_e, n_z, n_e (in conjunction with external constraints)
  - particle control and transient events (Maingi, Boundary meet.)

- New ME-SXR diode arrays at two toroidal locations ?
  - RWM physics and control
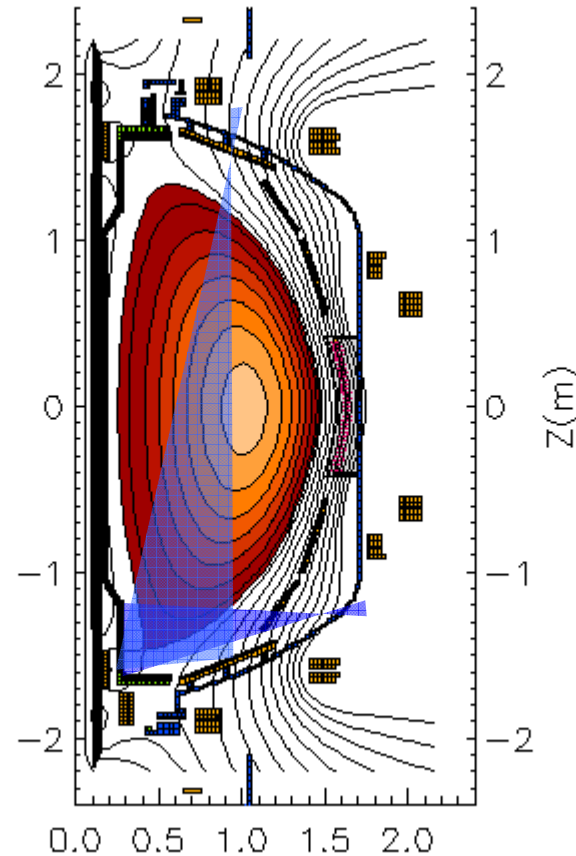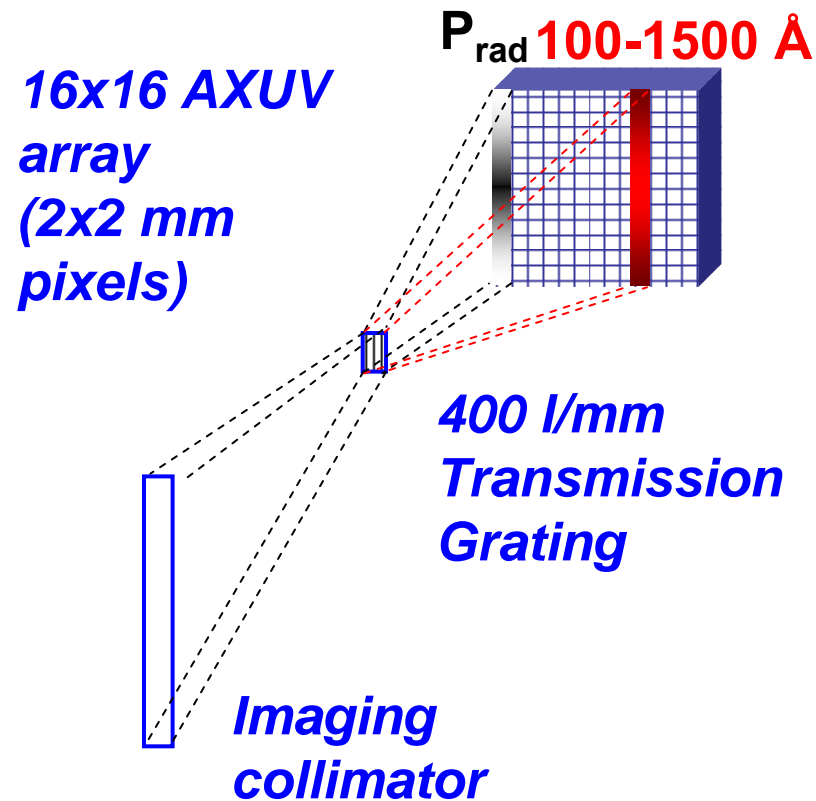 - replace aging USXR diode arrays (Tritz, MHD meet.)

High resolution tangential ME-SXR array for pedestal

AXUV-20 diode arrays

baffles

filters

Existent tangential OSXR

Planned high resolution tangential array
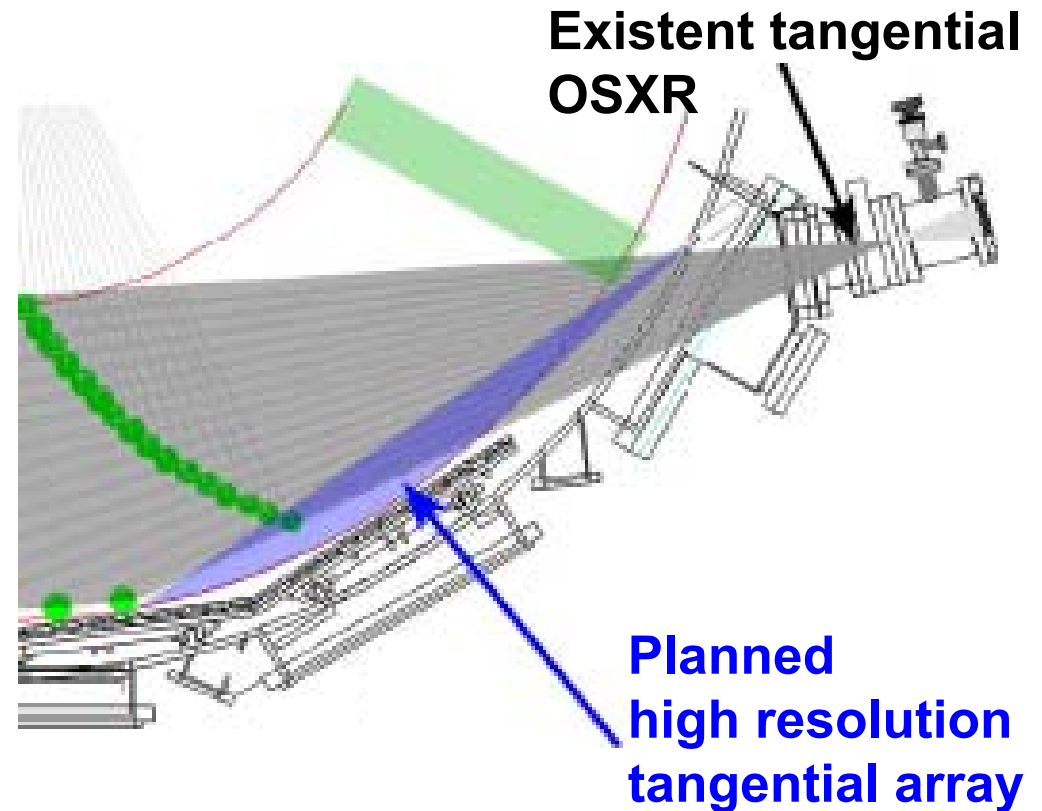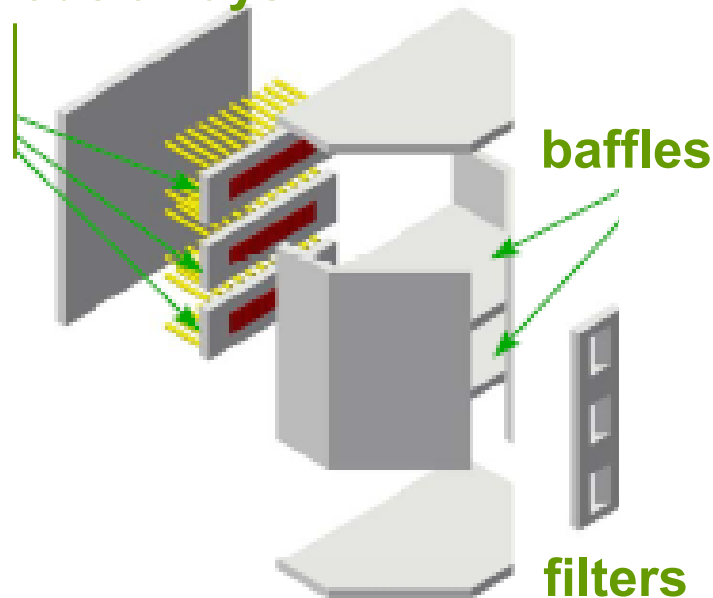
- $T_e(r,t)$ with ≤ 1 cm, few µs resolution (n_e, n_z with ∫ne dl constraint)

- Extend core electron/particle transport studies to pedestal (ELM, pellet)

- ELM structure, precursors, non-thermal electron distribution

- Develop ME-SXR for feedback and control (ELM, position, RWM)

ME-VUV arrays for fast, 2-D divertor diagnostic

P$_{rad}$ 100-1500 Å

16x16 AXUV array (2x2 mm pixels)

400 l/mm Transmission Grating

Imaging collimator

- Narrow-band (80-100 Å) 'radiometers' based on VUV TG + AXUV diodes
- 2-D T$_e$, n$_z$, n$_e$ (in conjunction with TS, $\int n_e dl$, or spectroscopy constraint)
- Prototype edge/SOL array within Advanced Diagnostic program