JHU diagnostic ideas for NSTX boundary

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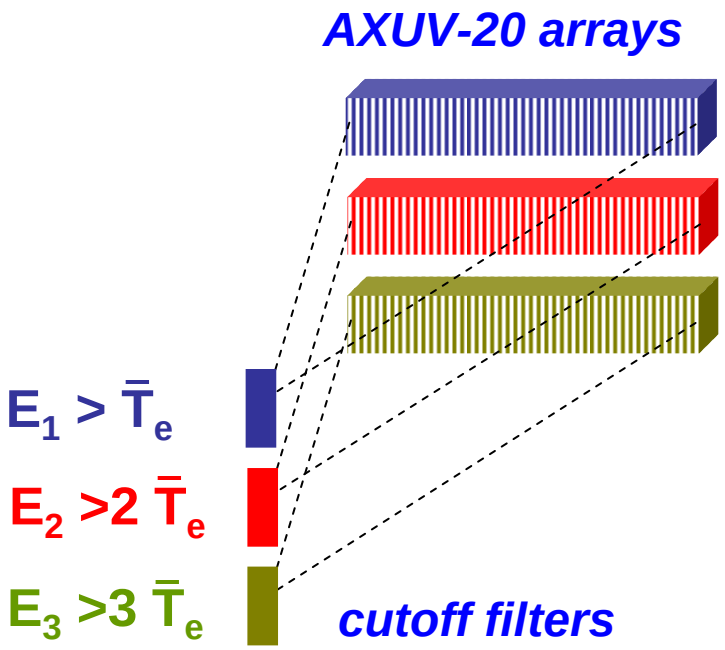
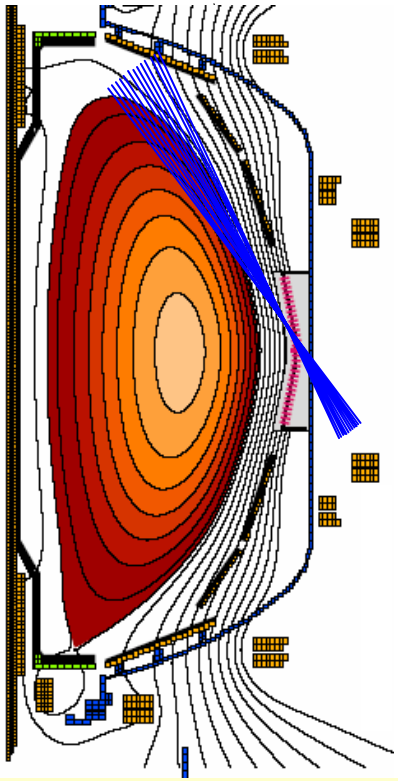
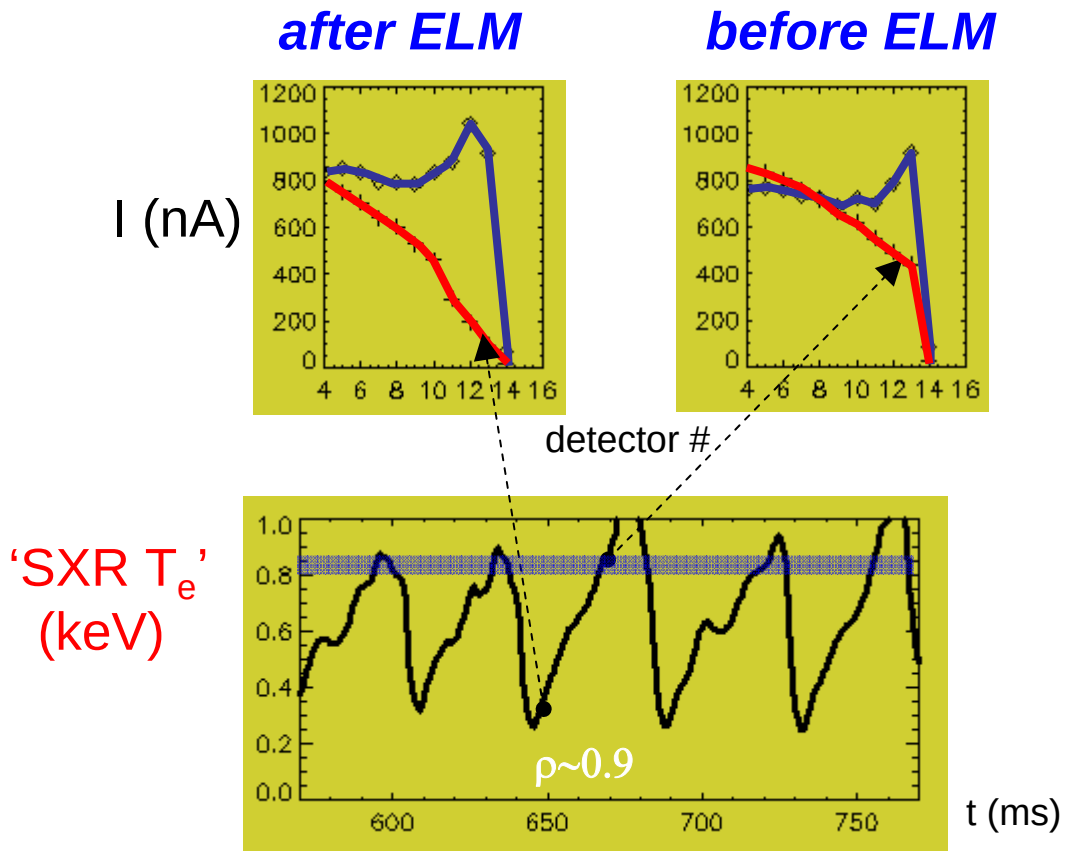
High resolution ME-SXR array for the pedestal



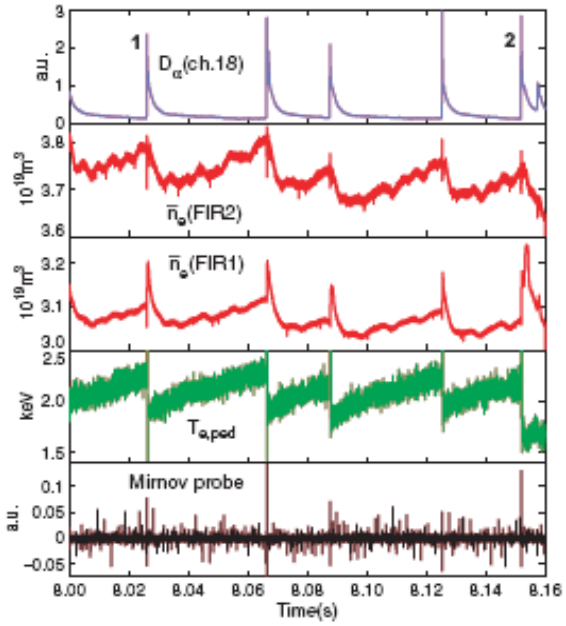


- $T_e(r,t)$ with 1 cm and few μs resolution (n_e, n_z with external $\int ne\, dl$)
- Extend core electron/particle transport studies to pedestal (ELM, pellet)
- ELM structure, precursors, EDF deviation from thermal
- Develop multi-energy SXR for feedback and control of BP

‘Active’ ELM control using ME-SXR feedback



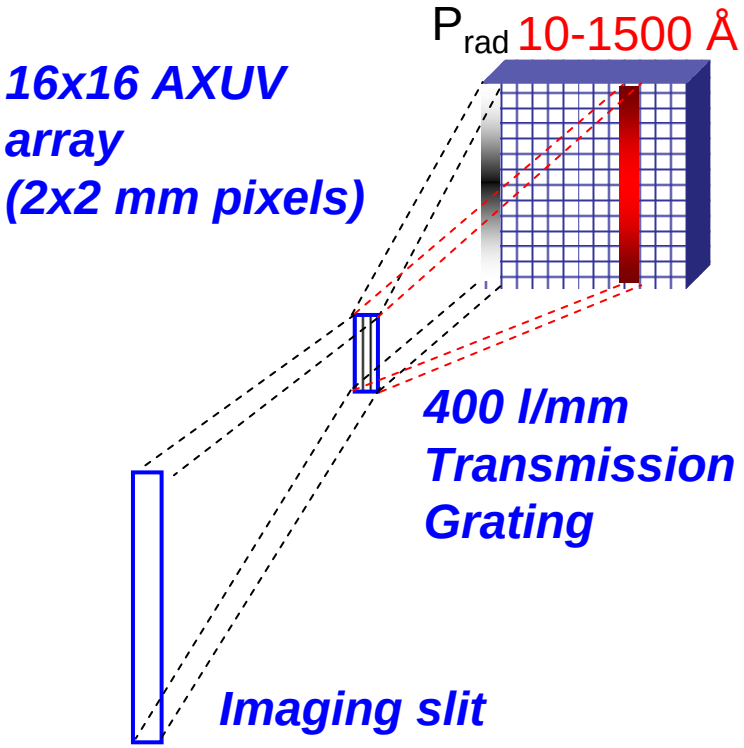
Type-I ELM in JT-60U

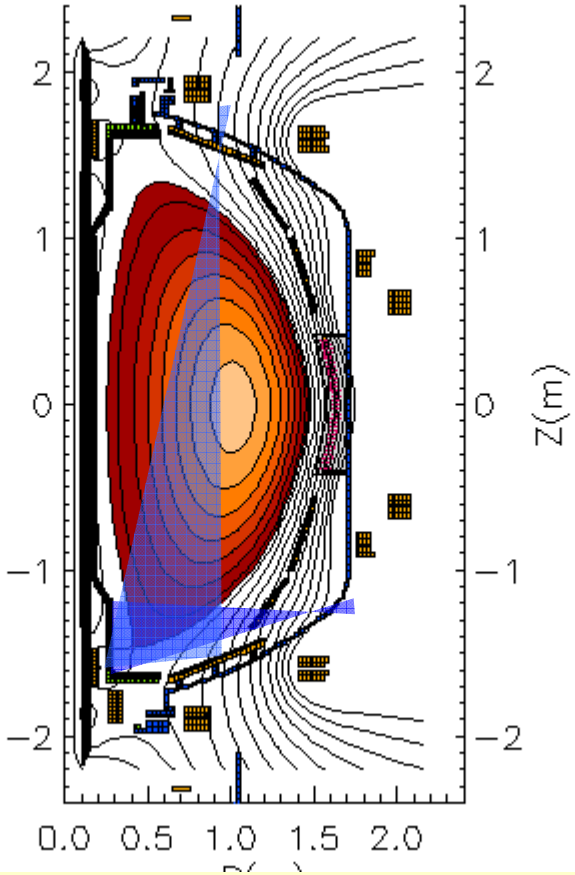


Chankin et al NF 2002

- τ_E, control system savings if ELM actively controlled ($\tau_{ELM\ BP}$ ~1s)
- ‘SXR T_e’ steadily increases during Type-I ELM cycle in NSTX
- ELM control using ME-SXR feedback may save > 50% of τ_{ELM}

2-D TG 'radiometers' for the divertor





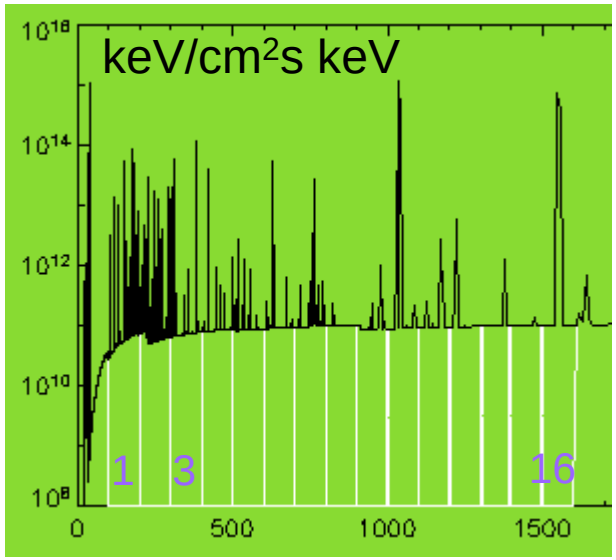
- **2-D P_{rad}, T_e, n_e, n_z measurements needed for the NSTX divertor**
- **Transmission Grating radiometers for 'multi-energy' VUV tomography**

TG radiometer for fast T_e, $n_e x n_Z$ divertor diagnostic

Computed divertor spectrum

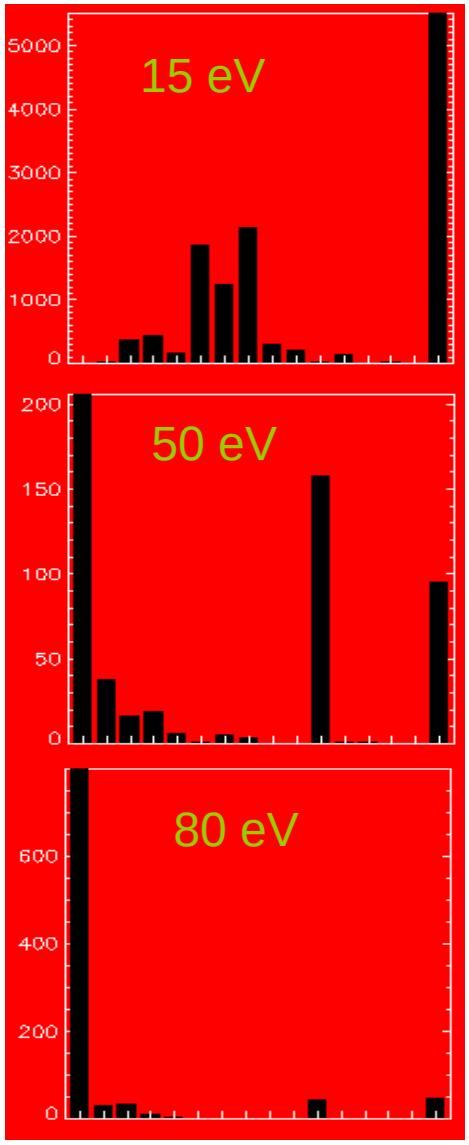
T_e=50 eV, n_e=5 10^{13}

4%C, 2%B, 0.4%O, l=25 cm



λ (Å)

Diode crt. (nA)



- **Sensitive T_e diagnostic for 5-100 eV range**
- **Fast, 2-D T_e (n_e, n_z in conjunction with TS)**