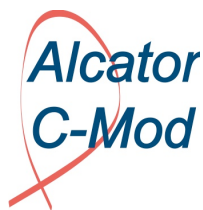

Initial fast ion measurements with FICXS

**Bill Rowan, Igor Bespamyatnov, A. Bader,
R. S. Granetz, and Ken Liao**



Initial fast ion measurements with FICXS

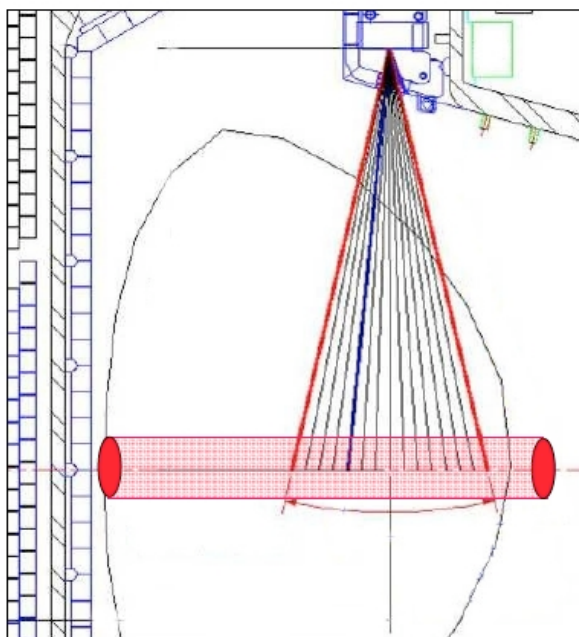
- ◆ **Contributors:** Bill Rowan, Igor Bospamyatnov, A. Bader, and R. S. Granetz, and Ken Liao
- ◆ **Topical Science Area:** ICRF
- ◆ **Idea:** Measure the fast ion spectrum in the plasma.
- ◆ **Motivation:** Detect fast ions in the plasma
 - Detect fast ions in the plasma for validation of the physics models for RF deposition physics
 - Transport of fast ions due to Alfvén modes
 - We have a measure of escaping fast neutrals (Bader). This would be a measurement in the plasma



Initial fast ion measurements with FICXS

Modify wide-view CXRS

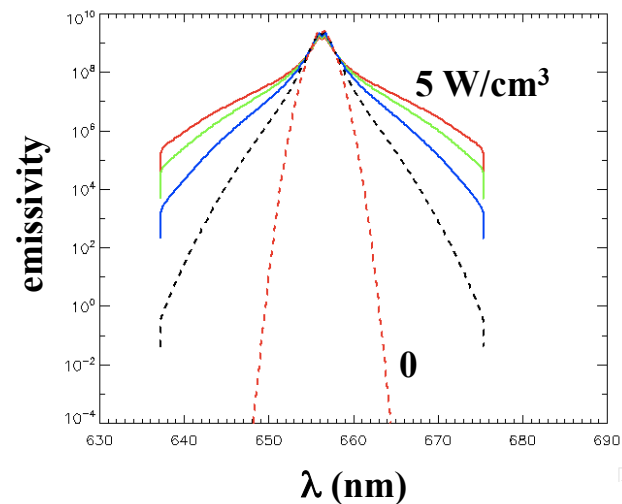
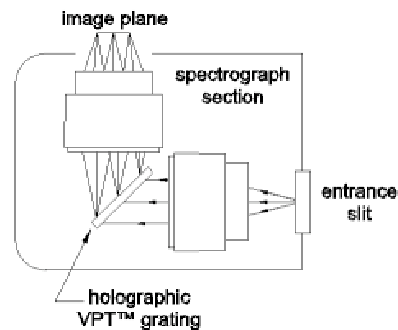
1. Use poloidal chords



19 chords
 $0.67 \text{ m} < R < 0.91 \text{ m}$
 $\Delta R \approx 1.2 \text{ cm}$

Alcator
C-Mod

2. Replace grating



3. Spectrum

FUSION
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Initial fast ion measurement with FICXS

- ◆ **Measurement Validation**
 - Initial measurement with highest possible RF deposition (PB)
 - Reduce RF in steps to find the lower measurement limits (1/2 D)
 - Develop a synthetic diagnostic for comparison to simulations
 - “Apply to RF validation” (PB/collaborative)
- ◆ **Measurement plan**
 - Initial experiments with high resolution instrumentation.
 - » Spectral analysis: Kaiser f1.8 Holospec
 - » Detection: PI Micromax
 - Improve the temporal resolution at expense of spectral resolution
 - » Spectral analysis: Filter scope
 - » Detection: photomultiplier array

