

Ultra-Fast Soft X-Ray system (UFSXR) replaces present USXR HUp and HDown arrays

Motivation:

Radial localization and measurements of poloidal structure for *AE modes up to 2MHz in L and H-modes

Projected capabilities:

Two-color filtered system (16 ch. x2) per array

Compact arrays (1/2 size of present arrays)

New diode size (1cm x 2cm) and pinhole distance increase signal \sim x16

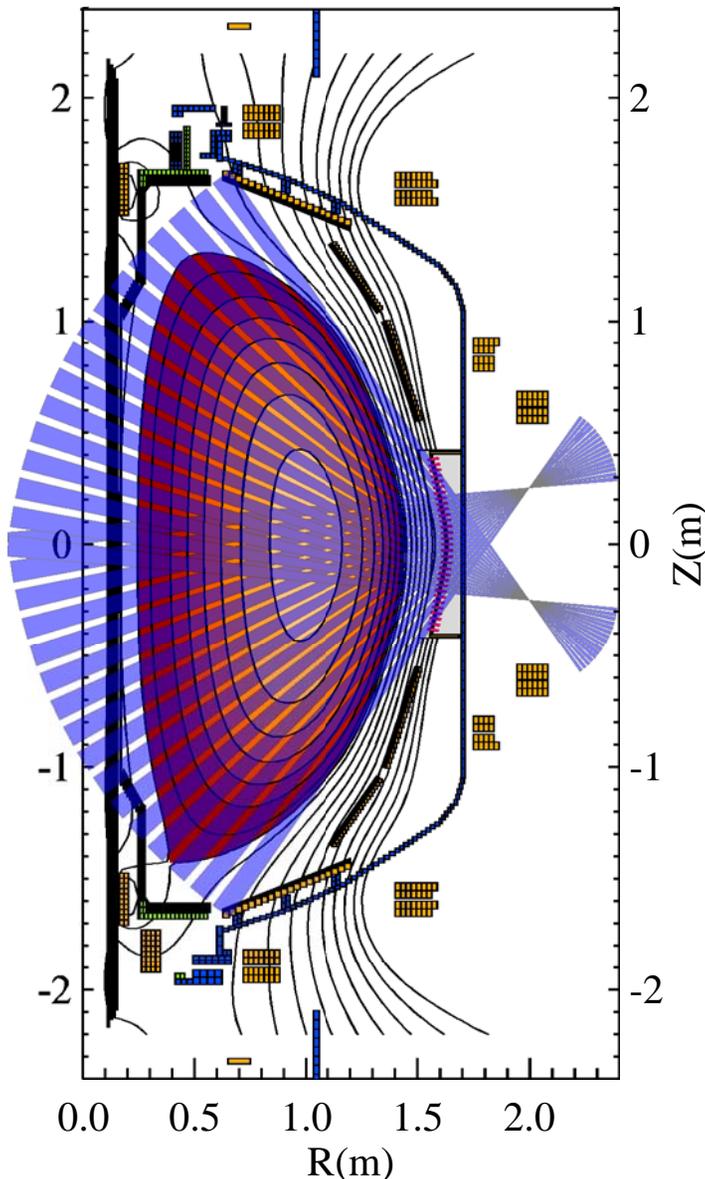
Sampling rate \sim 4MHz (2MHz Nyquist) 8x faster

SNR should be up to 2x larger than present USXR system (SNR \sim 200-1000) from photon statistics

Will likely require some in-vessel electronics/cooling

Additional vertical system?

Planned to be tested under the Advanced Diagnostic Development program



Cooled 'in-vacuum' electronics may be necessary for high-speed, low-noise performance

Use BES-style amplifier with increased BW (up to 2MHz) $10^5 - 10^6$ gain
- front-end JFET and feedback resistor placed near diode in vacuum
- system cooled with Peltier(s) and copper thermal backplate

D-tacq data acquisition modules available 16 channels @ 4HMz sampling

