
Electron Bernstein Wave Research on NSTX: Status and Near-Term Plans

Presented by

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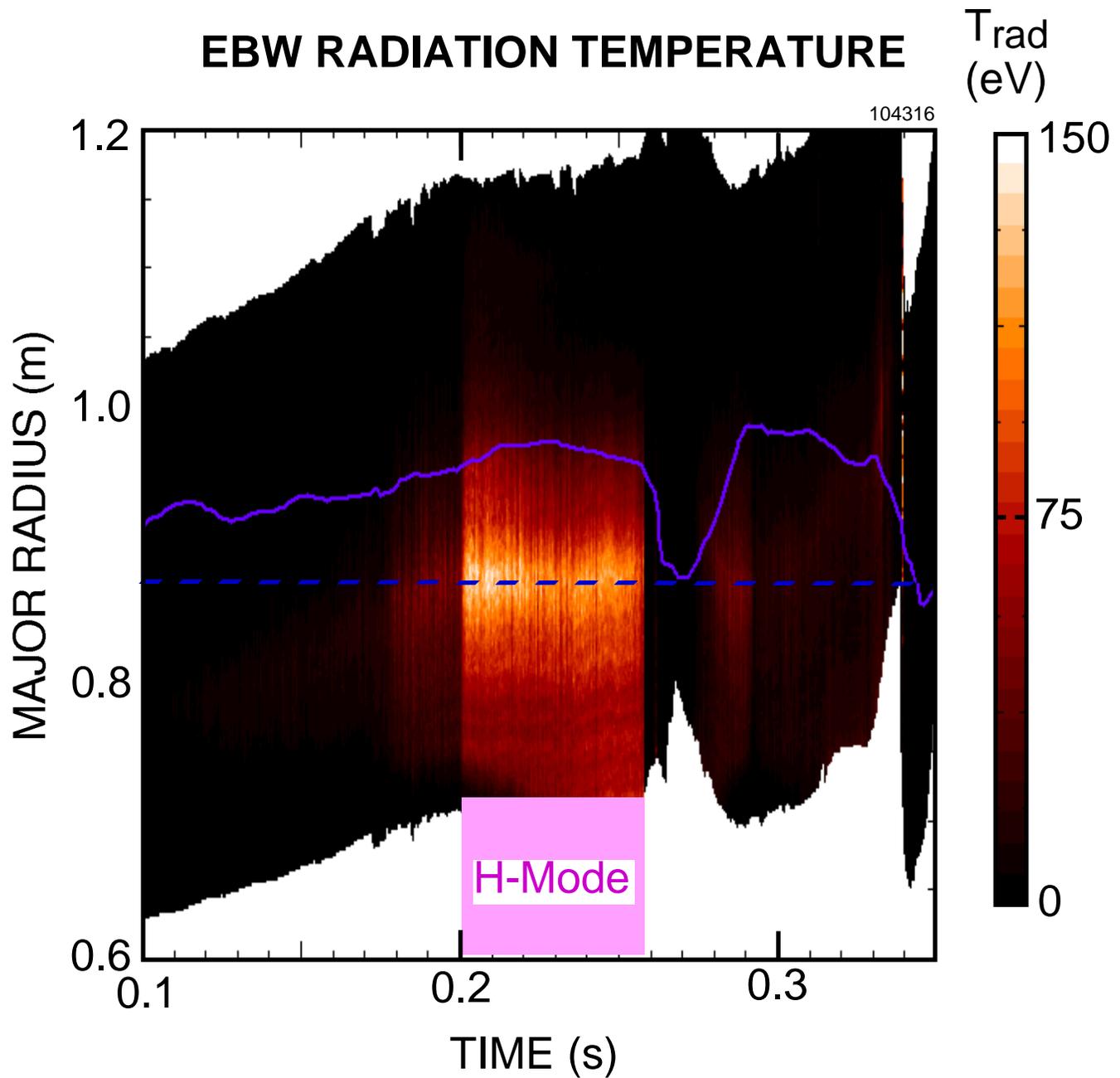
January 15, 2001



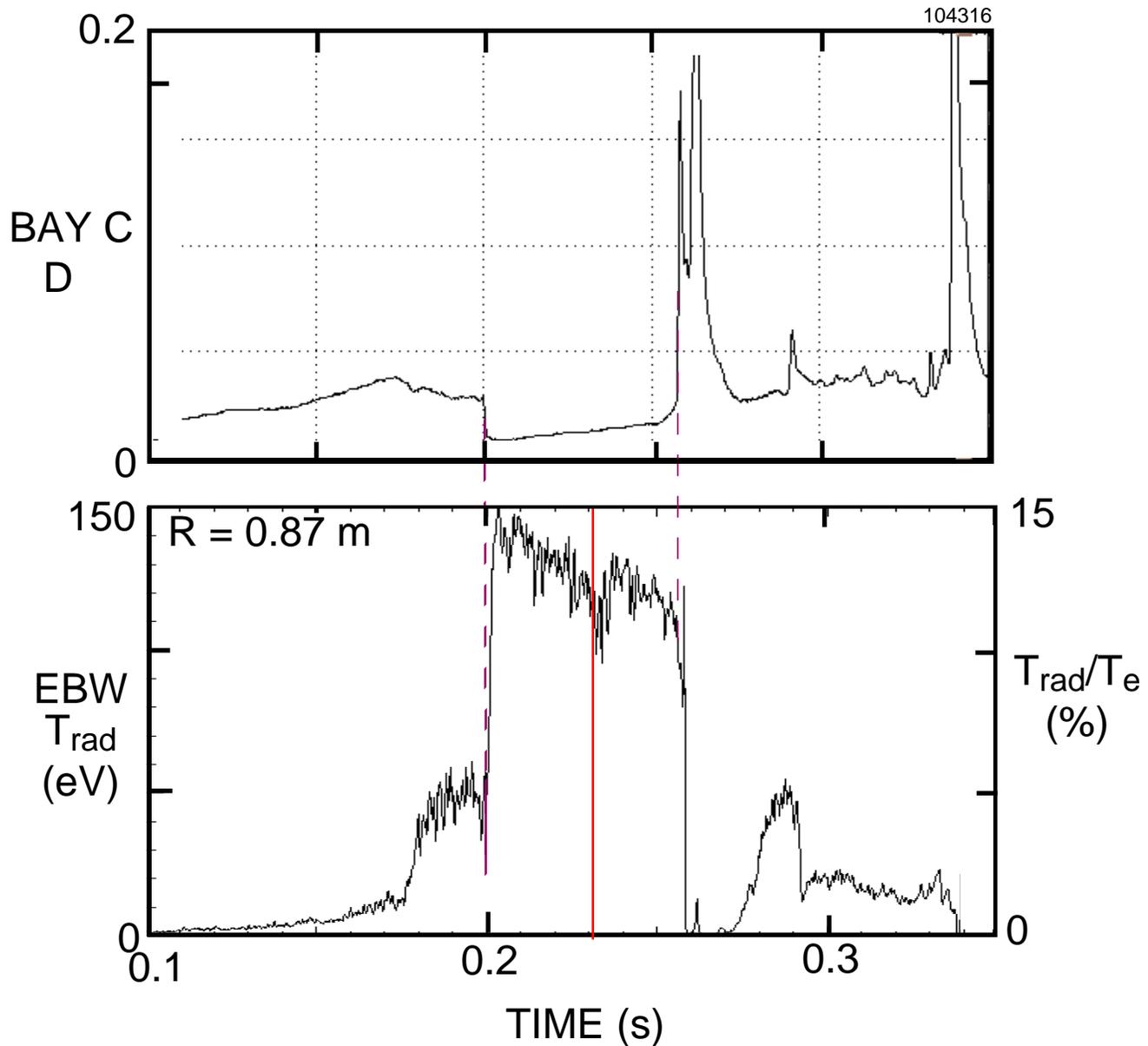
Status of EBW Emission Studies On NSTX During 2000

- Measured mode-converted EBW with 11-18 GHz fast ($<100\mu\text{s}$) scanning radiometer
- Used dedicated re-entrant mid-plane port and ORNL dual ridged antenna
- During NBI-heated H-modes, with steep edge density profiles, emission increased $\sim 300\%$
- Measured 10 - 20% mode conversion efficiency, consistent with theory
- Persistent multiple emission peaks observed during HHFW, so far not understood

EBW Emission Intensity Increases During H-mode



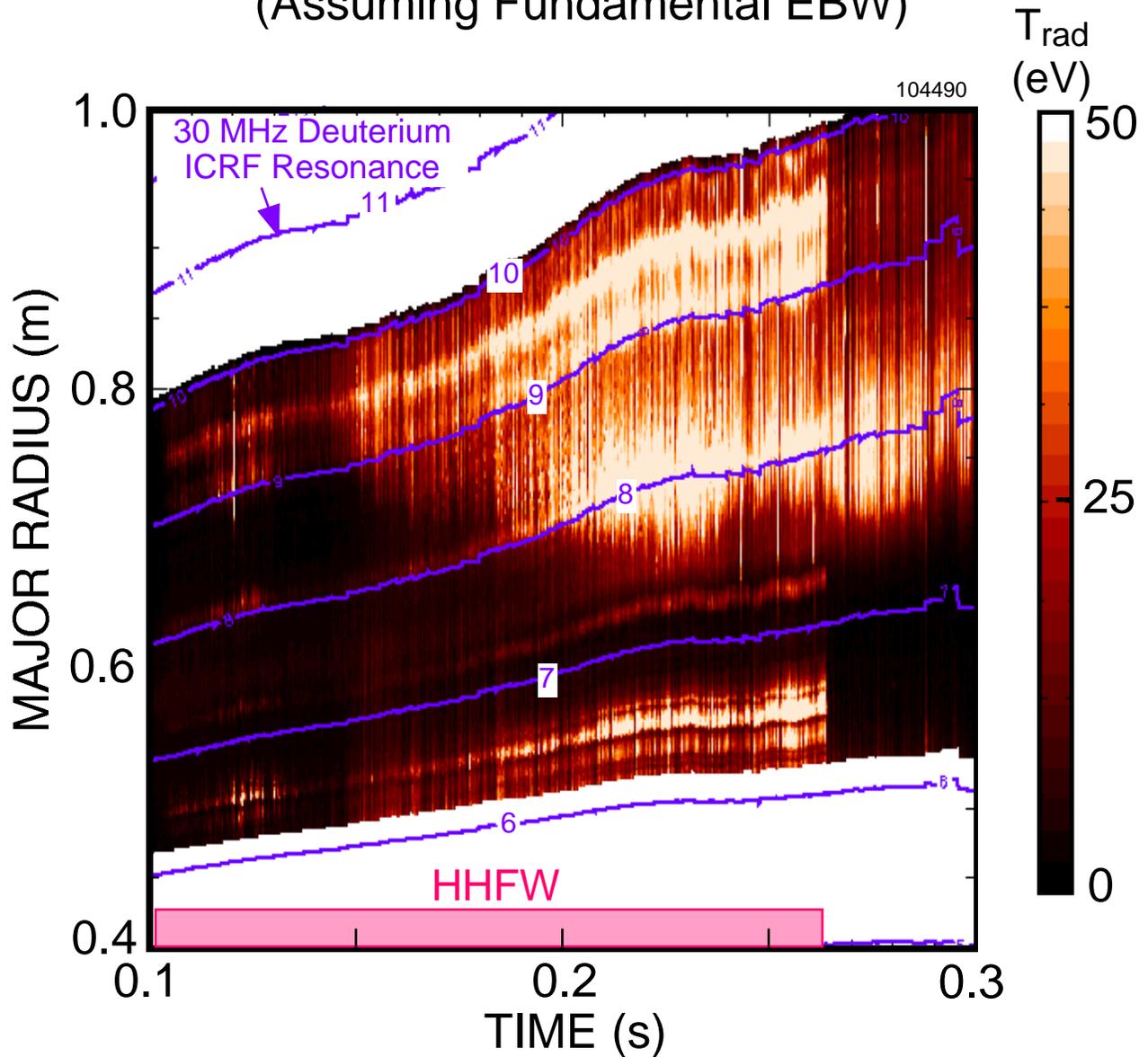
EBW Mode Conversion Efficiency increases from 5 to 15% at L-H Transition



- Edge $L_n \sim 1$ cm from Thomson scattering implies EBW $T_{\text{rad}}/T_e \sim 11\%$ at 0.23 sec

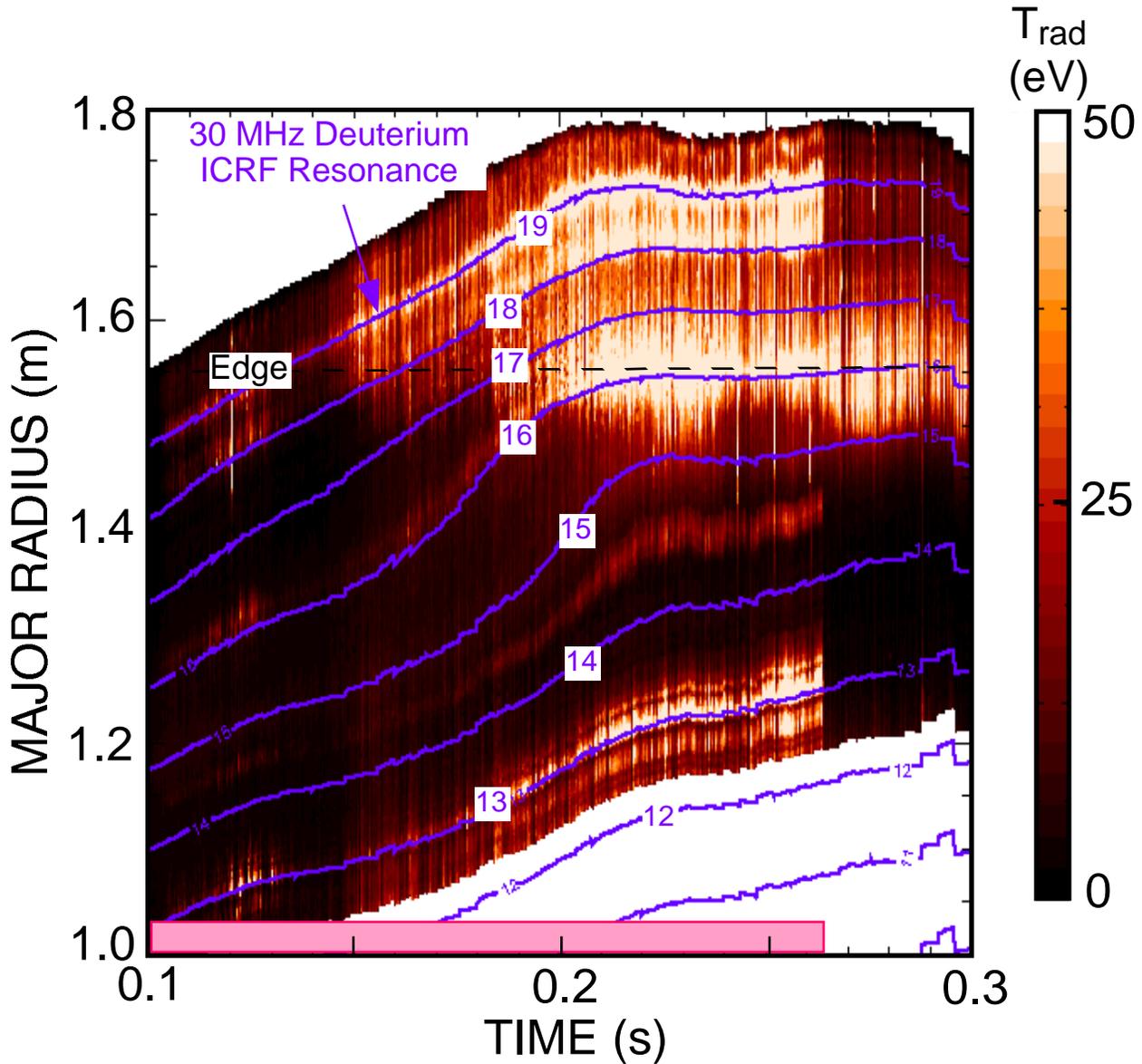
EBW Emission Spectrum Exhibits Multiple Peaks During HHFW Heating

EBW RADIATION TEMPERATURE (eV)
(Assuming Fundamental EBW)

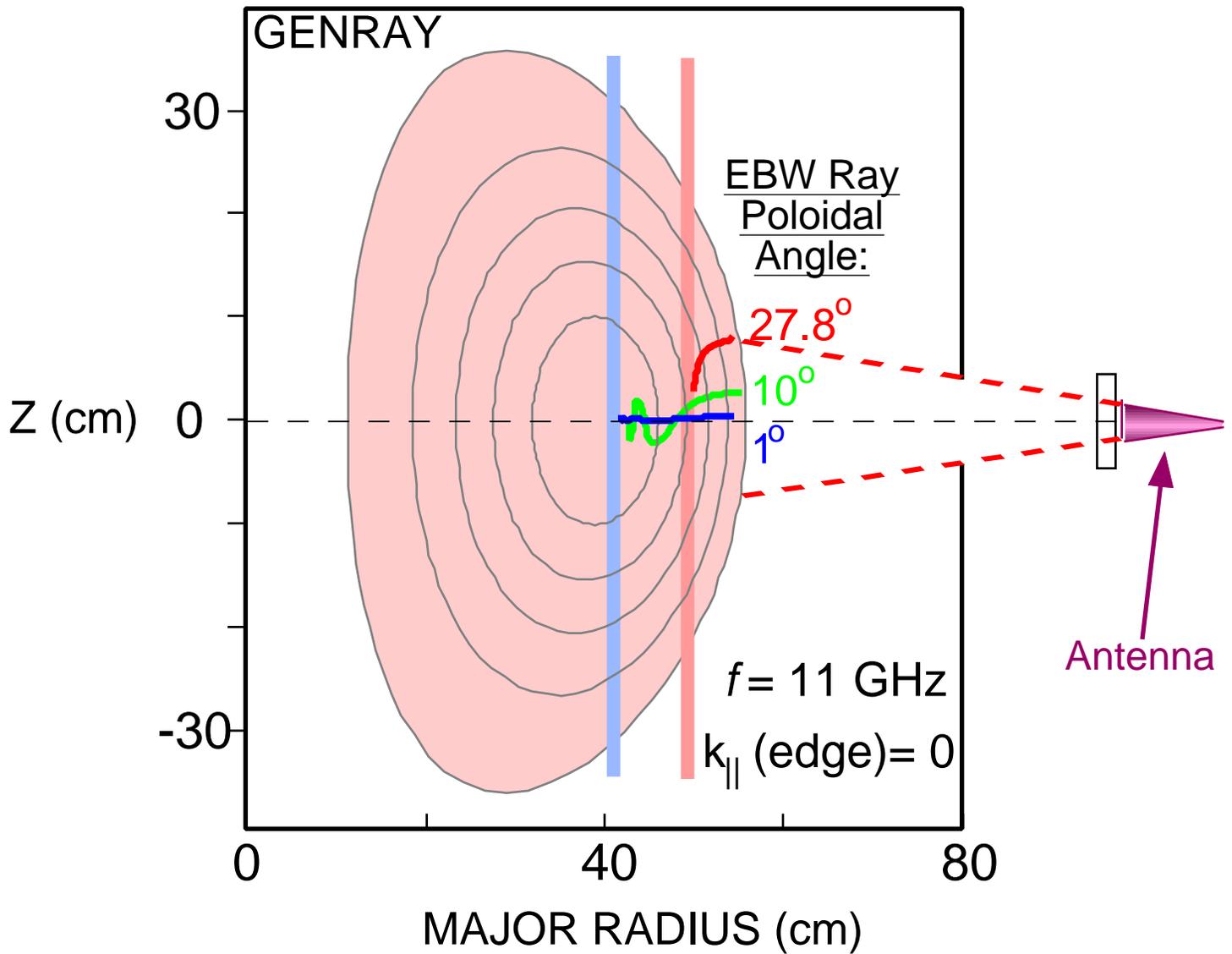


Location of EBW Peaks Often, But Not Always, Near Deuterium ICRF Resonances

EBW RADIATION TEMPERATURE (eV)
(Assuming Second Harmonic EBW)

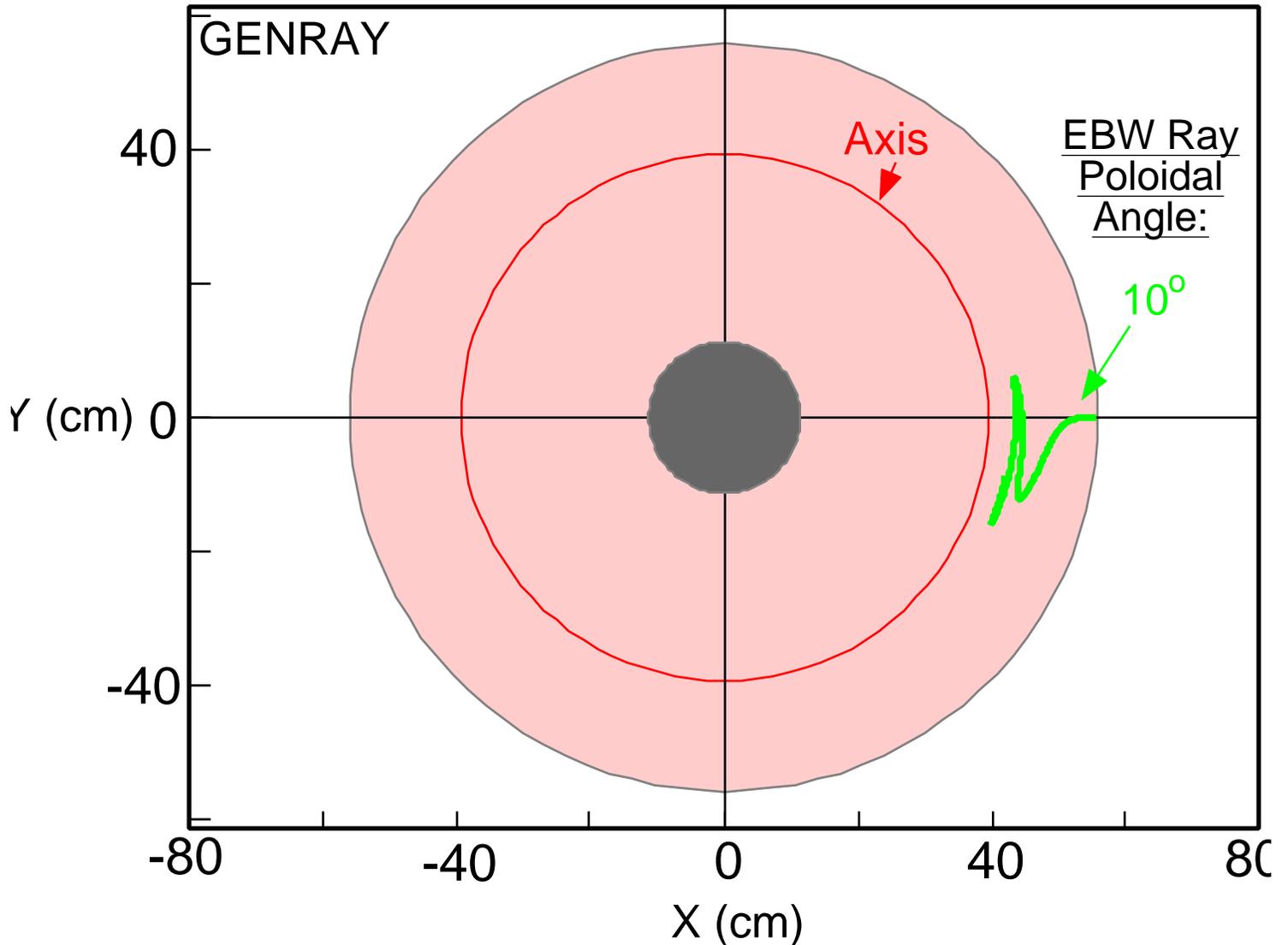


Ray Tracing, Weighted by Antenna Pattern, Needed to Determine EBW Resonance Location



Significant EBW Damping Where Ray has Large n_{\parallel}

EBW Ray Projection on Midplane



Plans & Issues for EBW Research On NSTX During 2001

- Add 8-12 GHz EBW radiometer in March to increase radial coverage
- Use neon puffs to study EBW source localization and radial transport
- Modulate 18 GHz ORNL ECH during plasma, look at EBW emission with UCLA off mid-plane horn
- Need data on L_n at UHR from ORNL and UCLA reflectometers
- Include ray tracing weighted by antenna pattern*
- Need to model expected EBW emission for actual NSTX plasmas we are studying
- On CDX-U, continue EBW research with an in-vessel antenna/probe assembly