

“FISHBONE” MODES AND THE BEAM-ION DISTRIBUTION FUNCTION

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Goal: Use new MSE q profile diagnostic and SSNPA (simultaneous beam energy and position) diagnostic to

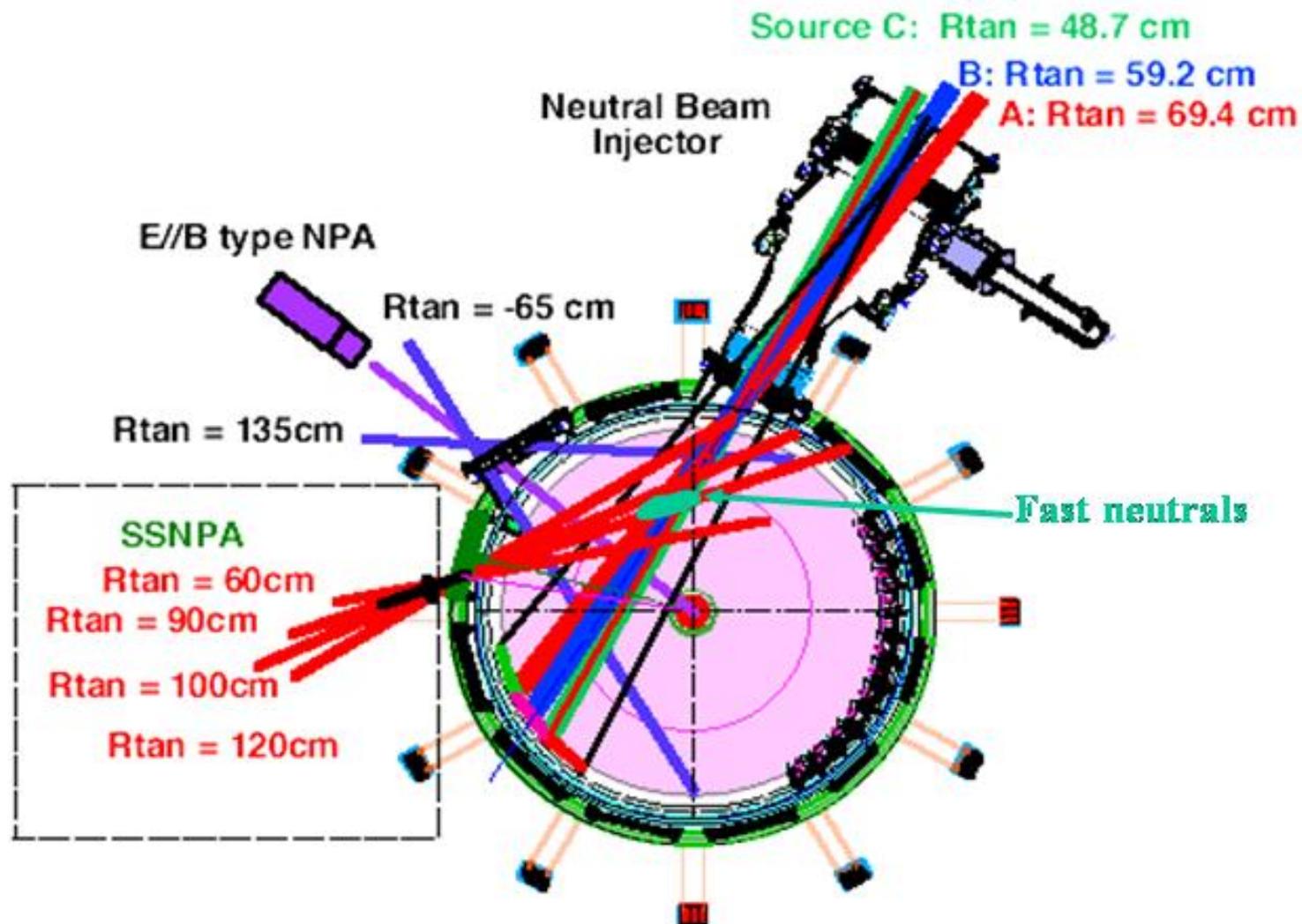
1. Determine which fast ions drive which n 's and
2. Measure consequent radial transport

“Fishbone” Theory: Resonance Depends on Parameters we can Control or Measure

- The bounce frequency $\omega_b \propto \sqrt{E}/q$; also the bounce angle θ_B .
- The precession frequency $\omega_p \propto Eq/B$; also θ_B and the magnetic well.
- Can vary E through injection energy and θ_B through injection angle.
- Use MSE to measure q .

Fredrickson, Chen, and White, Nucl. Fusion **43** (2003) 1258.

Sightlines of SSNPA



Tentative Runplan

- Make discharges with early and late chirping (q variation) and neutron drops in at least one phase.
- Repeat shots for good SSNPA statistics. Scan E||B NPA to match SSNPA angles.
- Change injection angle and/or injection energy.
- Change B and/or I_p to alter ω_b/ω_p .