Current Profile Modifications and Fast Ion Loss from BAAEs/EPMs

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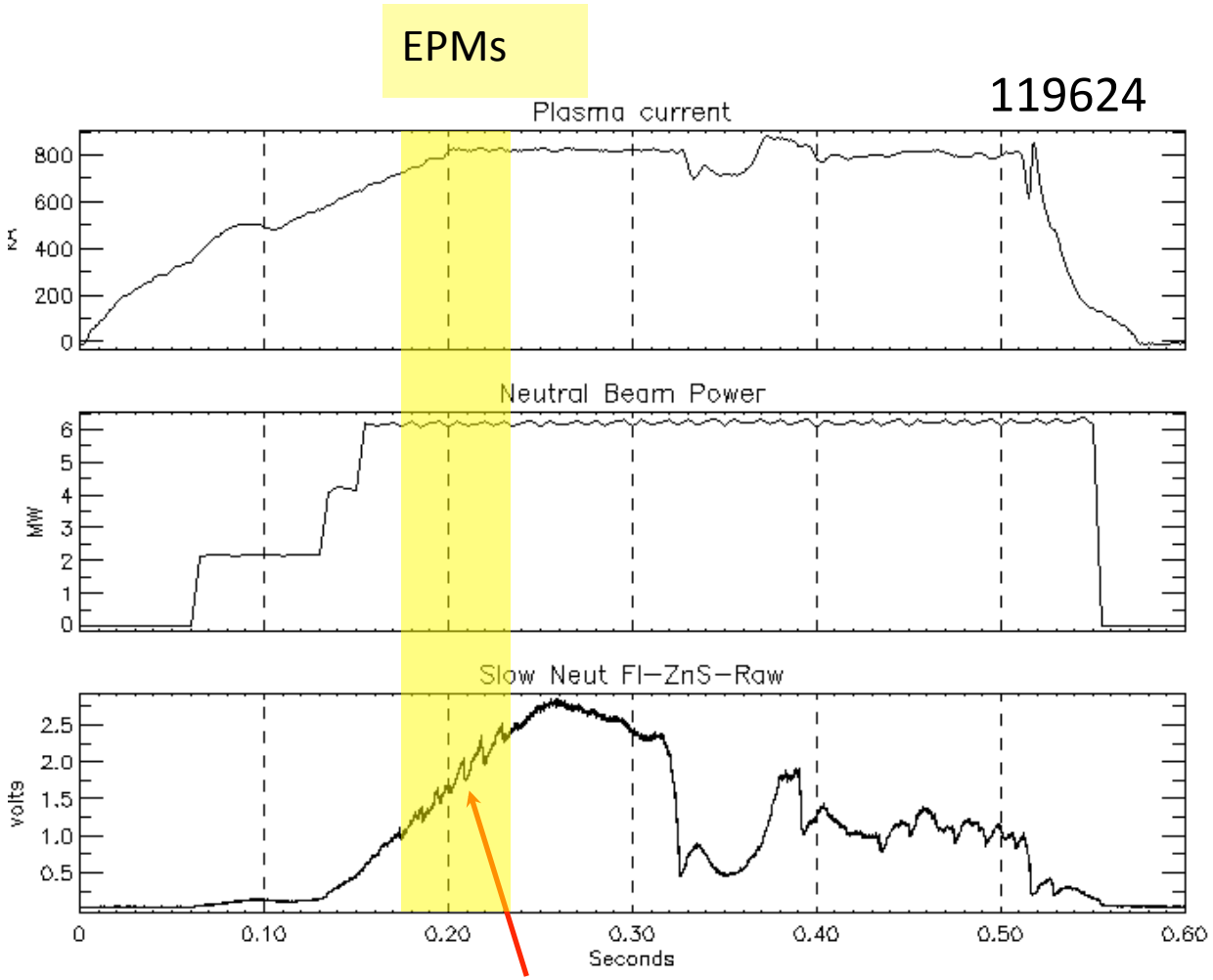
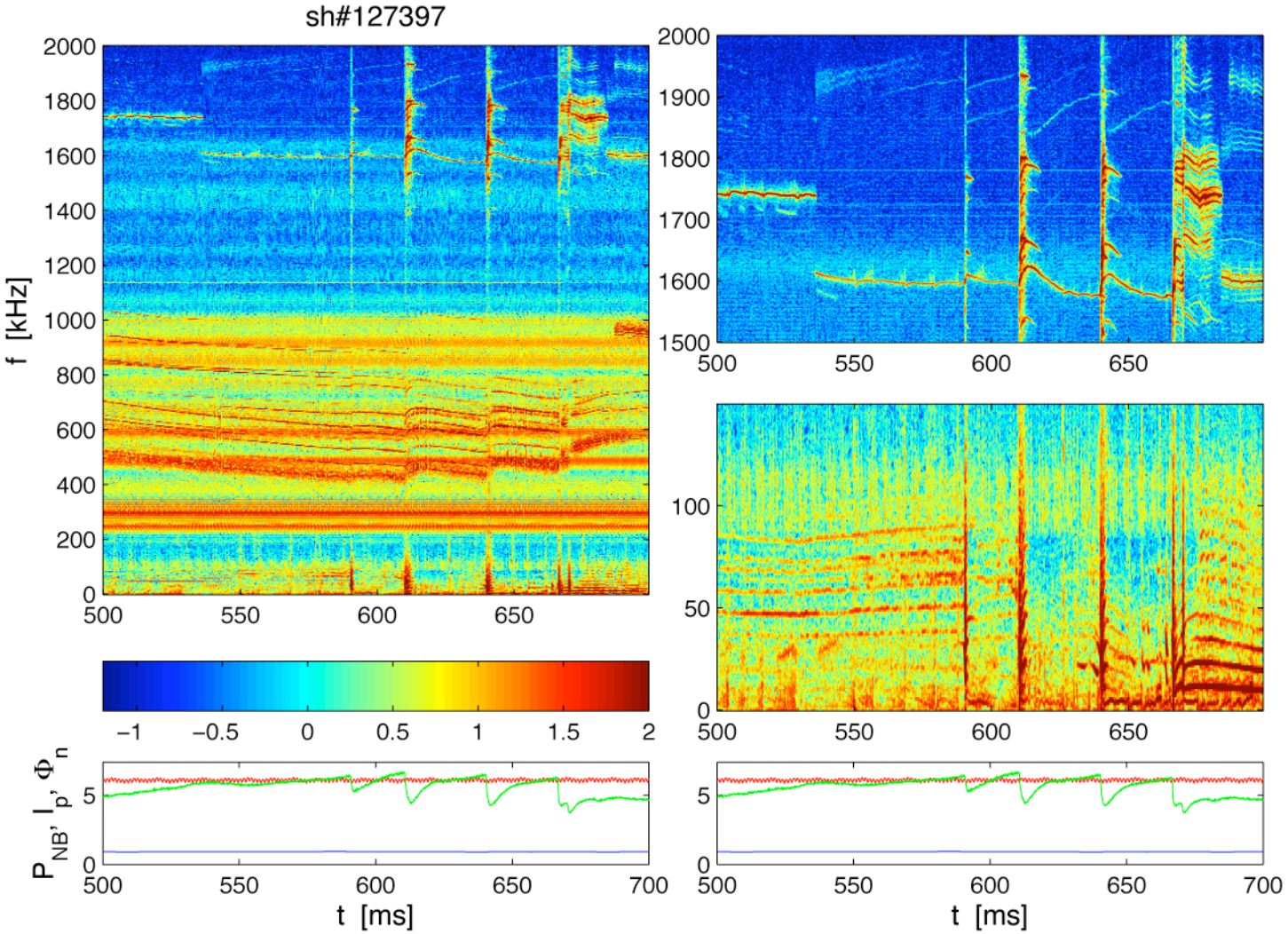
BAAE/EPM bursts expel NB ions & may redistribute current



- Bursts are often seen during Ip ramp up, causing neutron drops and possibly contributing to rapid j(r) redistribution
- Important for NHTX, VNS, & ITER to quantify j(r) transport due to modes

Bursts also seen during I_p flattop—simplest situation to study



Experimental plan

- Reload shot with bursts during flattop (127383, 127393, or 127397) from 2008
- Check for presence of bursts
- Reduce I_p or alter density if no bursts
- Document effects of bursts on j(r), fast ion loss
- Focus on effect of repeated bursts as a single burst appears to have indistinguishable effect on MSE
- Document mode numbers, profiles & amplitudes
- Repeat shots with n=3 braking to get data on mode structure near ω_{rot}=0

Key diagnostics

- MSE: j(r, t)
- Mirnov coils: mode n, freq, & amplitude
- FIDA: $f_{NB}(E, r, t)$
- NPA: $f_{NB}(E, r, t)$
- CHERS:$\omega_{rot}(R, t)$ (for fast ion loss torque)
- Neutron detectors: $S_n(t)$
- sFLIP: $\Gamma_{loss}(E, \chi, t)$
- SXR array: mode structure
- FIReTIP: mode structure
- Reflectometer: mode structure? (H-mode)
- High-k scattering: mode structure info

Analysis emphases

- MSE: Focus on cumulative effect of multiple bursts as bursts occur too frequently to separate in MSE data; identify amount of current transported to or from each flux surface
- Mode profile diagnostics: fit best mode radial profiles and compare with NOVA predictions for BAAE under those conditions; compare also at lowest attainable toroidal rotation: how well do modes match BAAE theory?