SOL Width using the NSTX Flush Mounted Divertor Langmuir Probes

C. E. Bush, et al.

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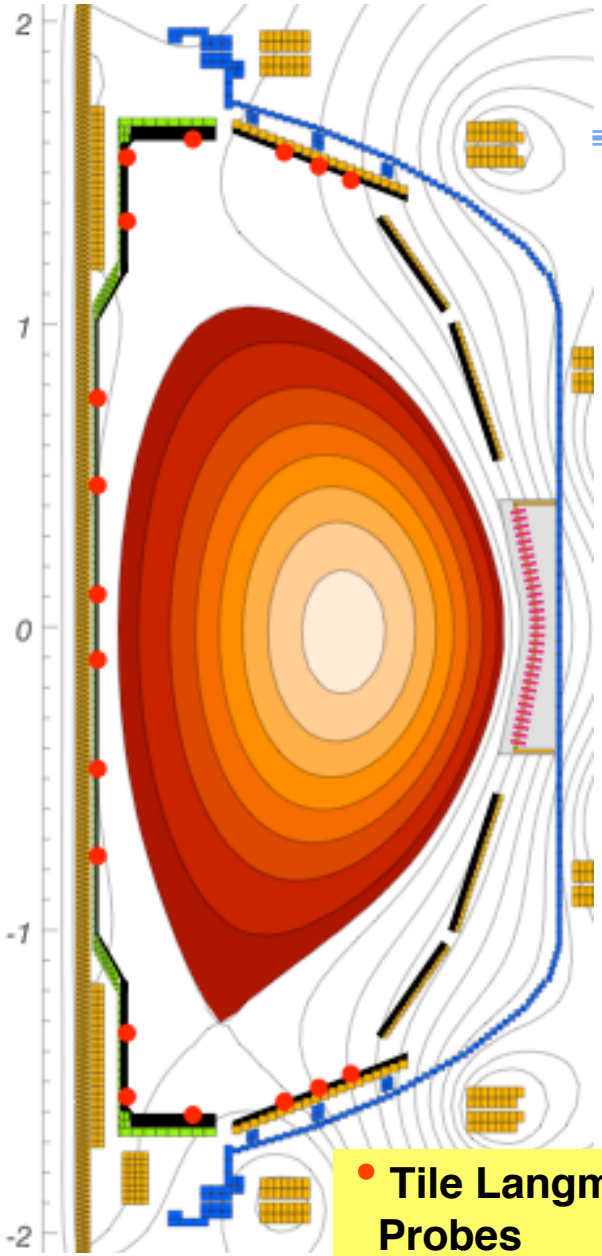
Goal: Obtain probe T_e, n_e, Jsat, falloff at plama edge

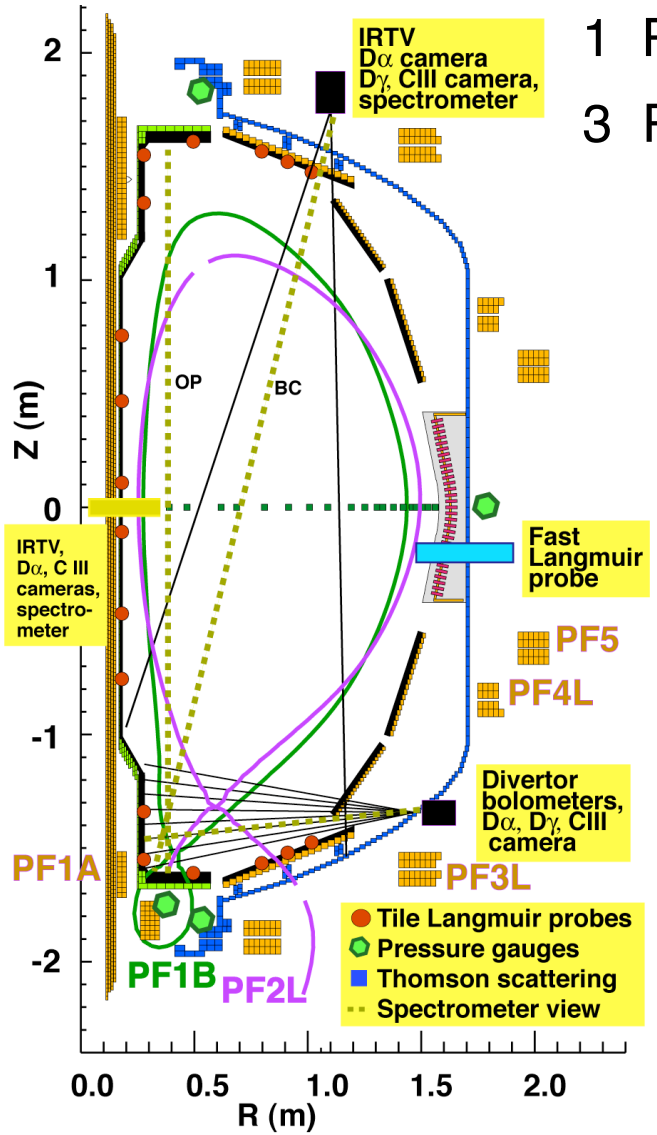
Probes are installed in divertor, centerstack, and new electrode



- Tile Langmuir Probes

- Flush mounted single probes
- Total of 27 probes, 6 top and 6 bottom divertors
  - Some along centerstack
  - 5 on new Electrode (fast)
- Have data for vast majority of shots
- Virtually no signal from centerstack probes when plasma is diverted
- Some I_{sat}, T_e, n_e data in Tree

Divertor Langmuir Probes

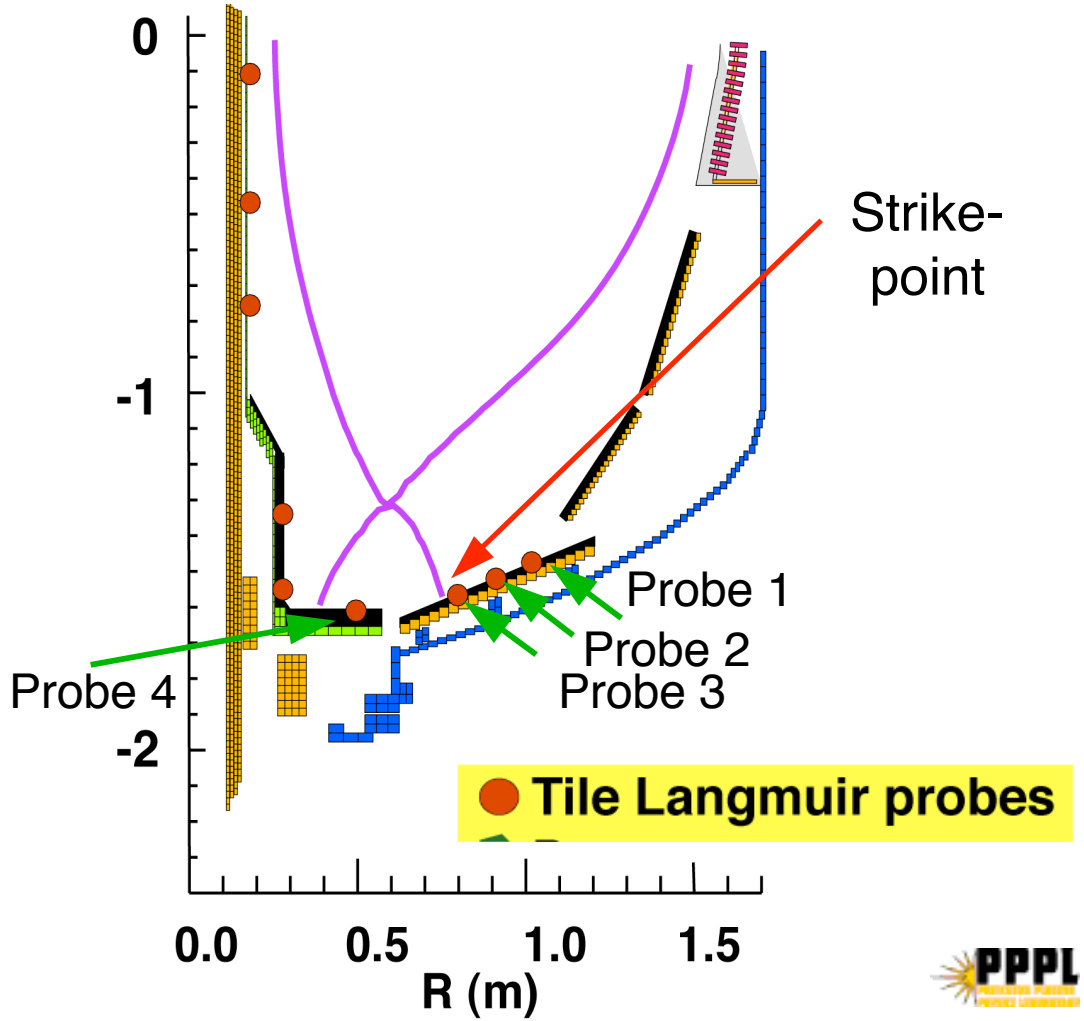


1 R(probe 1) = 1.02 m

2 R(probe 2) = 0.91 m

3 R(probe 3) = 0.80 m

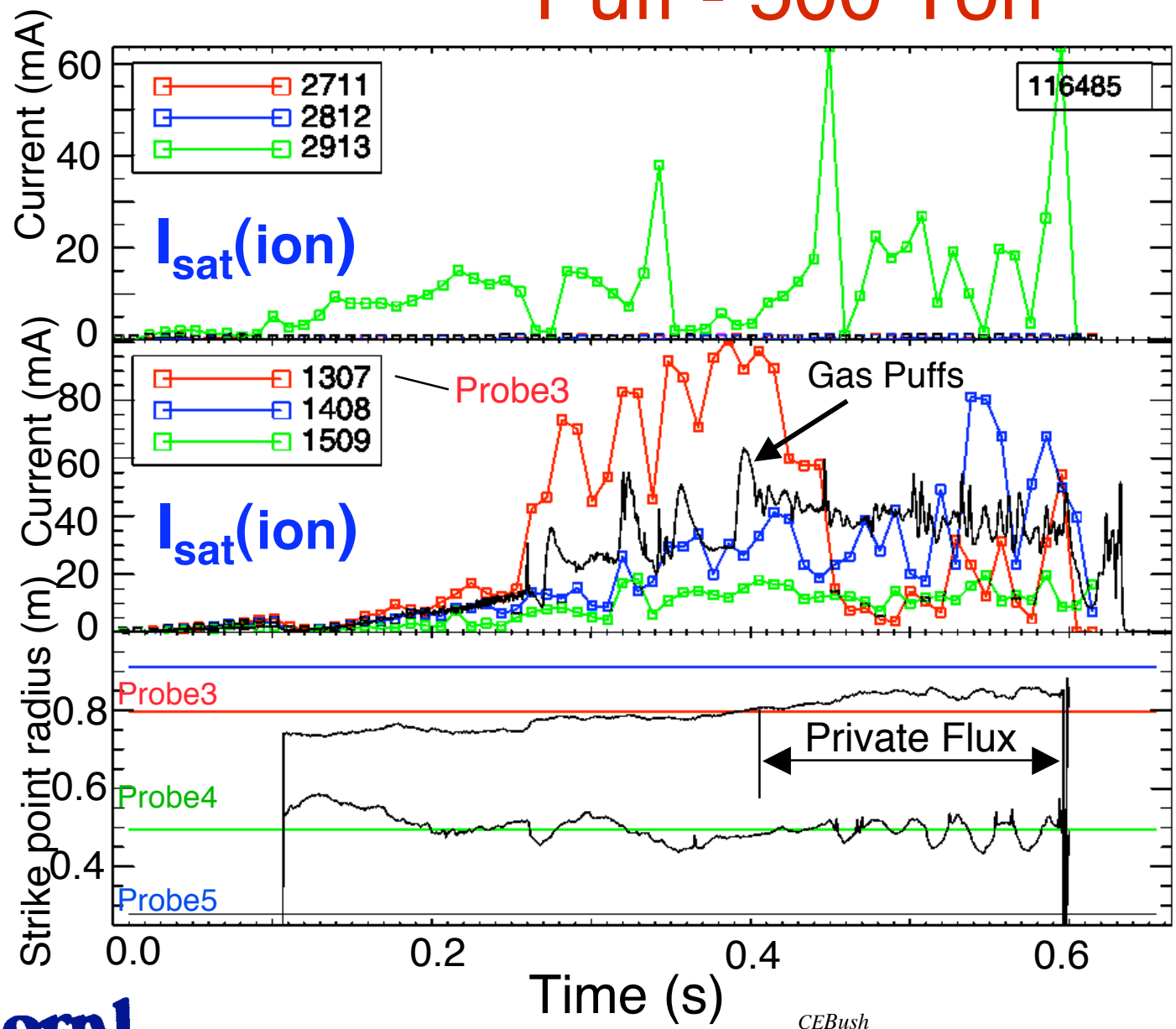
4 R(probe 4) = 0.49 m



ornl

PPPL

I_{sat} for Probes: Divertor GAS Injector Puff - 500 Torr



LRDFIT

With Gas Puffs I_{sat} shows correlation,

(1) between probes,

(2) with gas puffs

(3) with D_α

(4) when probes "move" to private flux region

ornl

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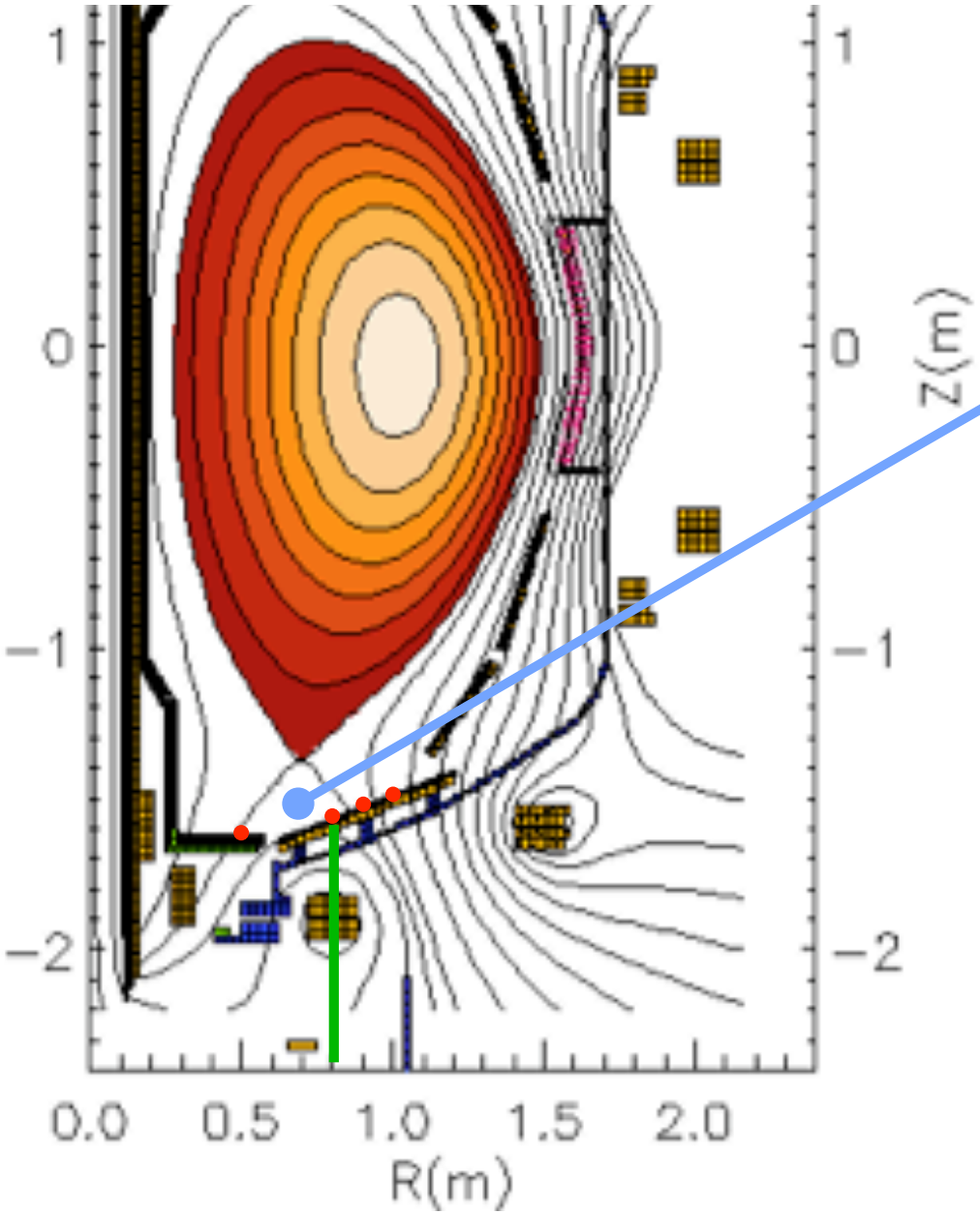
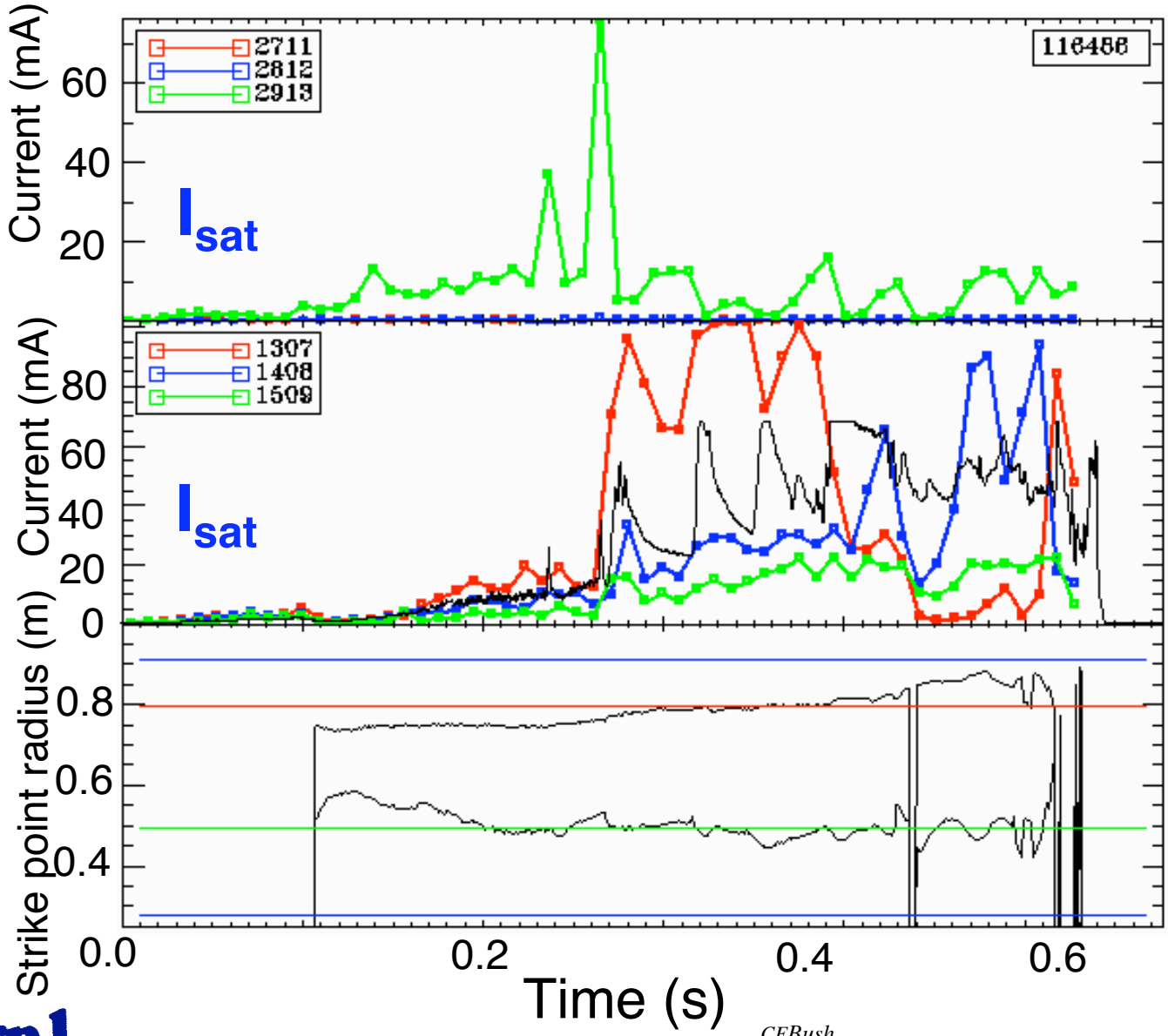
PPPL

Probe 3 is in Private Flux Region at 0.5 secs



Both EFIT and LRDFIT equilibrium codes show Probe 3 to be in private flux region at t = 0.5 s

I_{sat} for Probes: Divertor GAS Injector Puff - 700 Torr

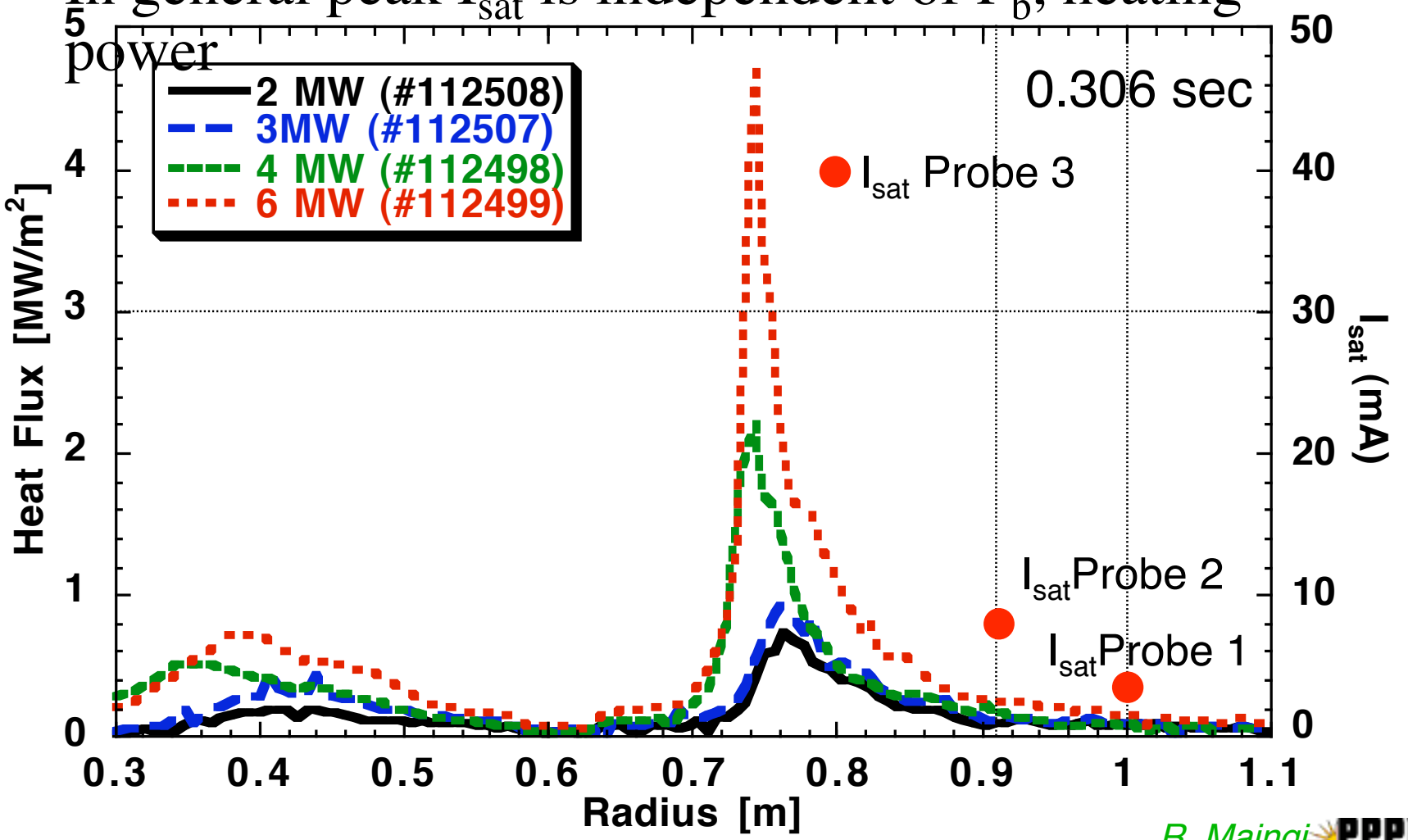


LRDFIT

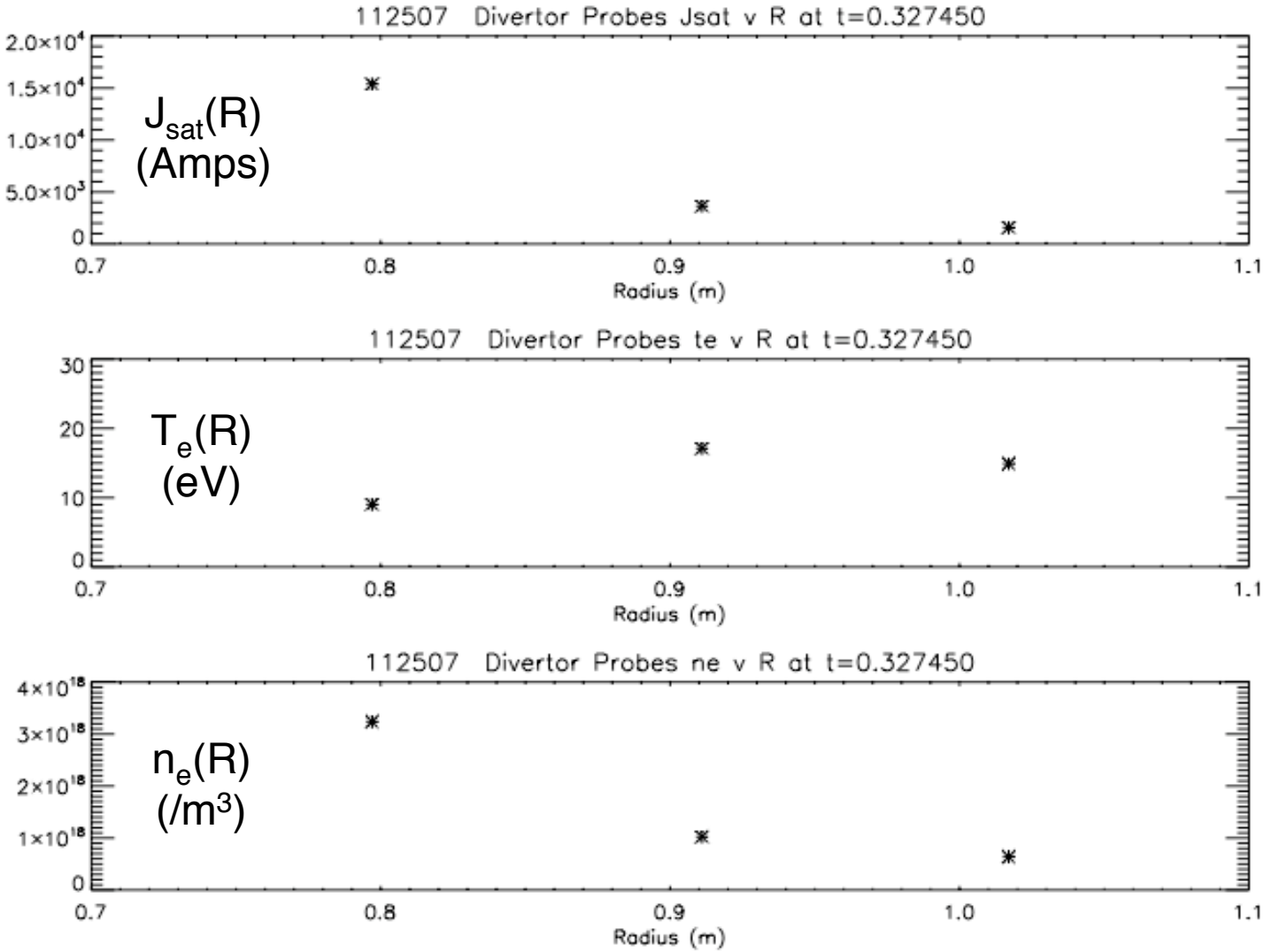
CEBush

Heat Flux Profile Becomes More Peaked with Increasing NBI Power

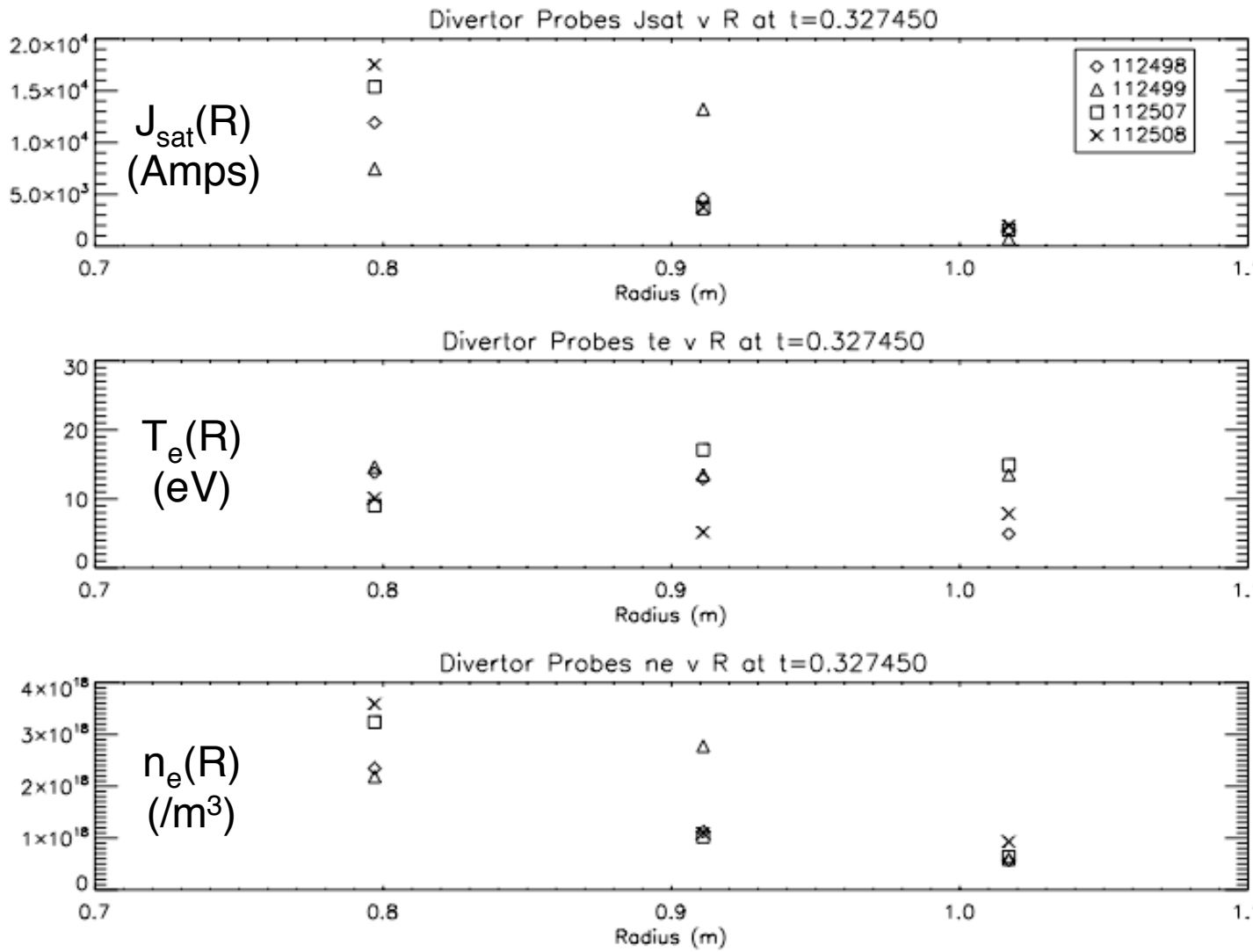
- Peak in I_{sat} occurs near peak heat flux
- In general peak I_{sat} is independent of P_b, heating power



Radial Variation of J_{sat}, T_e and n_e on Divertor Plate for NBI Power = 3 MW



Radial Variation of J_{sat}, t_e and n_e on Divertor Plate with NBI Power



NBI Power Scan

2 MW 112508

3 MW 112507

4 MW 112498

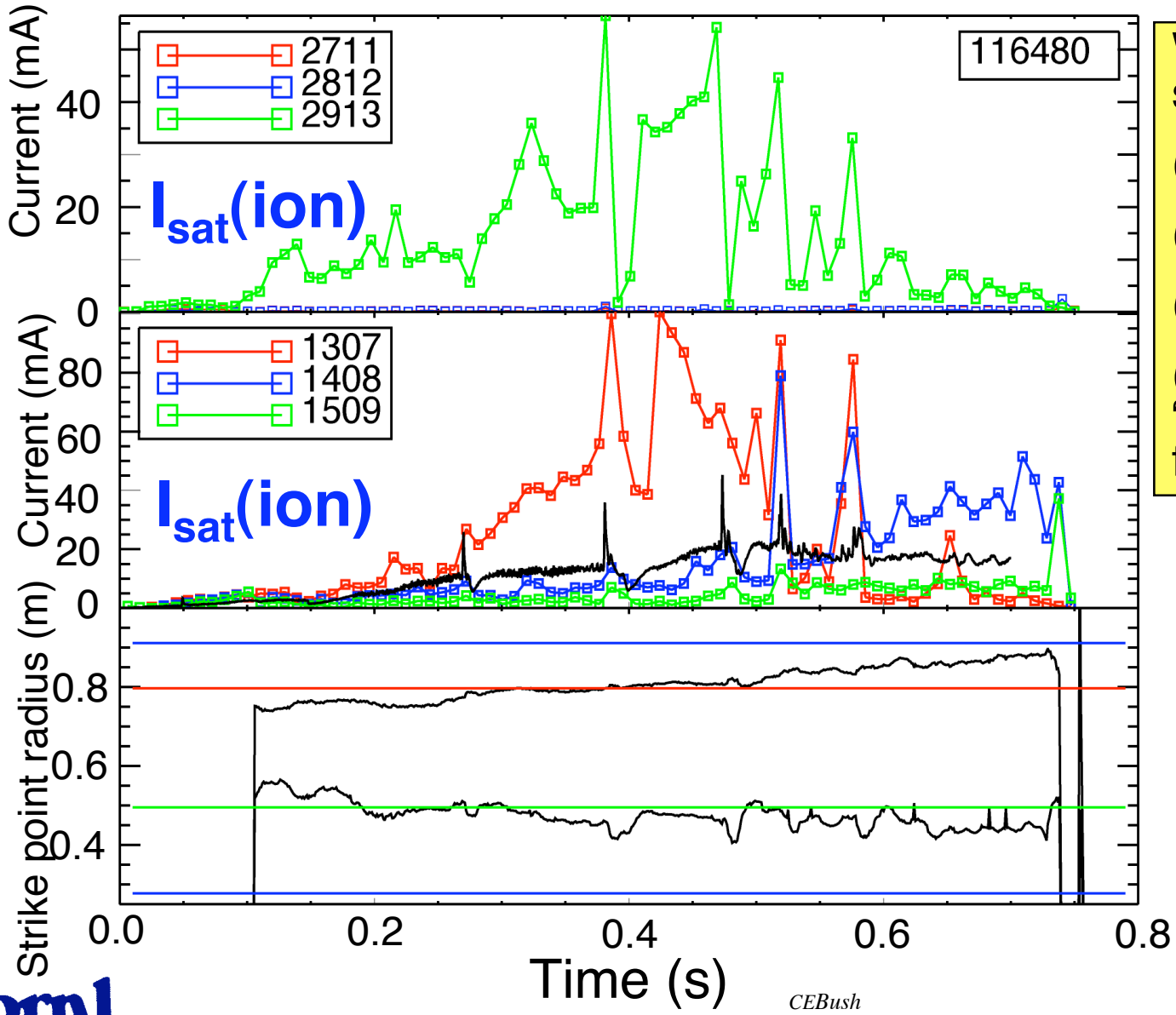
6 MW 112499

Conclusion

- Flush-mounted probes can provide coarse information on SOL width

EXTRA

Waveforms of I_{sat}(ion) for Outer Divertor Probes



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