Modeling Results for NSTX HHFW Heating During Neutral-Beam Injection

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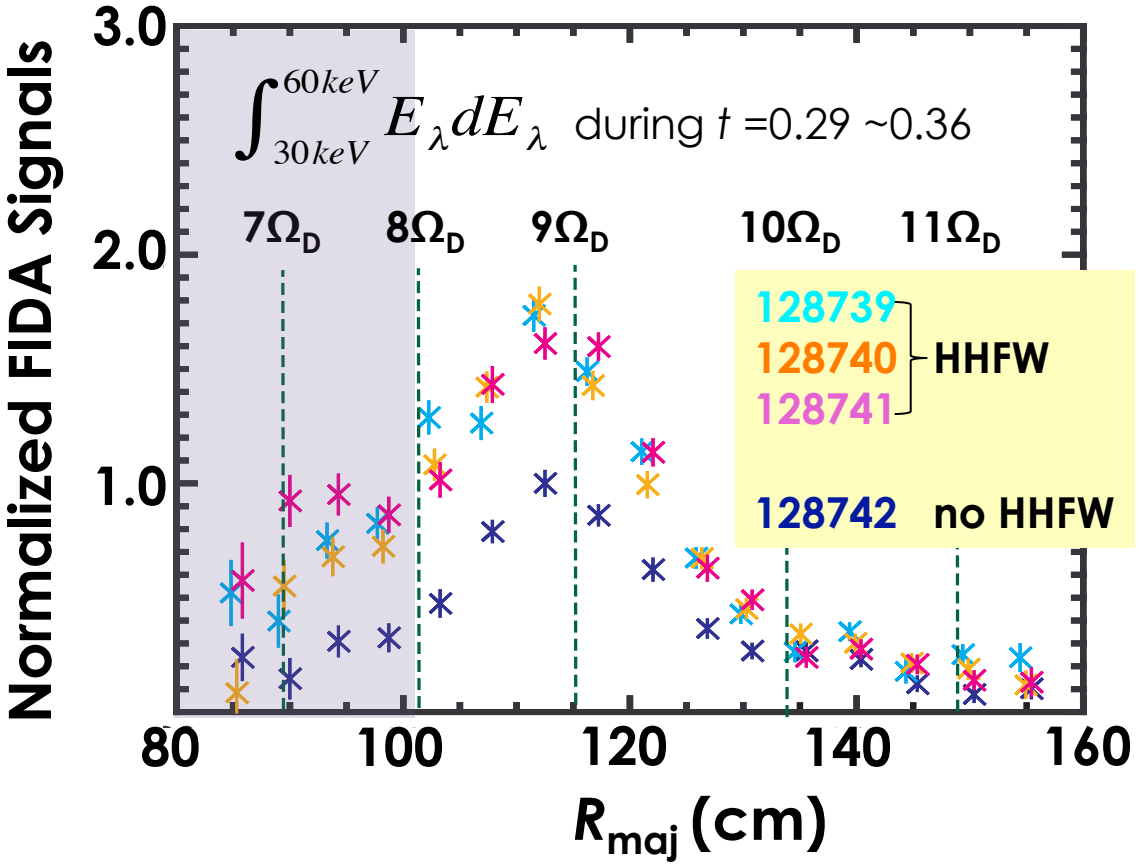
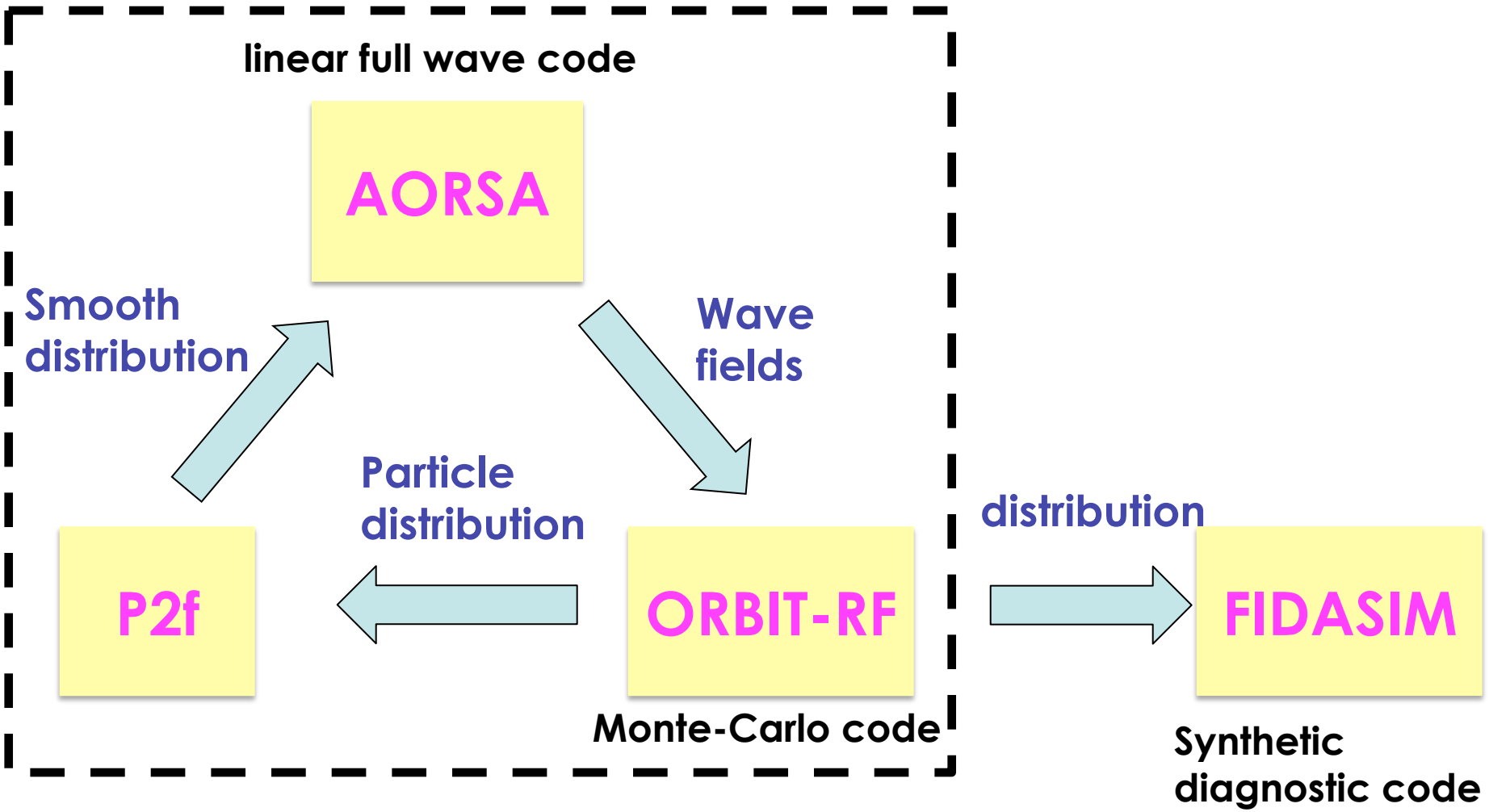
HHFW Heating Discharges during NB Injection Indicate Increase of FIDA Signals against NB Only



- P_{RF}=1.0MW, f=30MHz
  P_{nb}=2.0MW, E_{inj}=65keV
- A factor of three enhancement in neutron rates in all HHFW shots

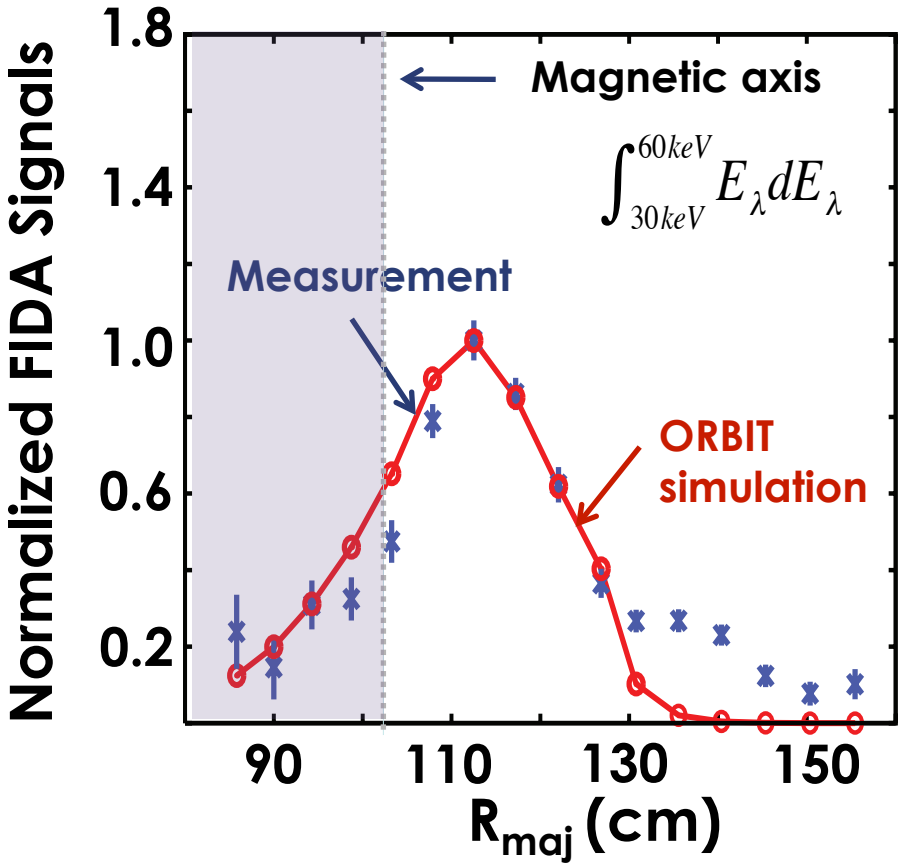
- **Off-axis of peaks in both NB only and NB +HHFW**

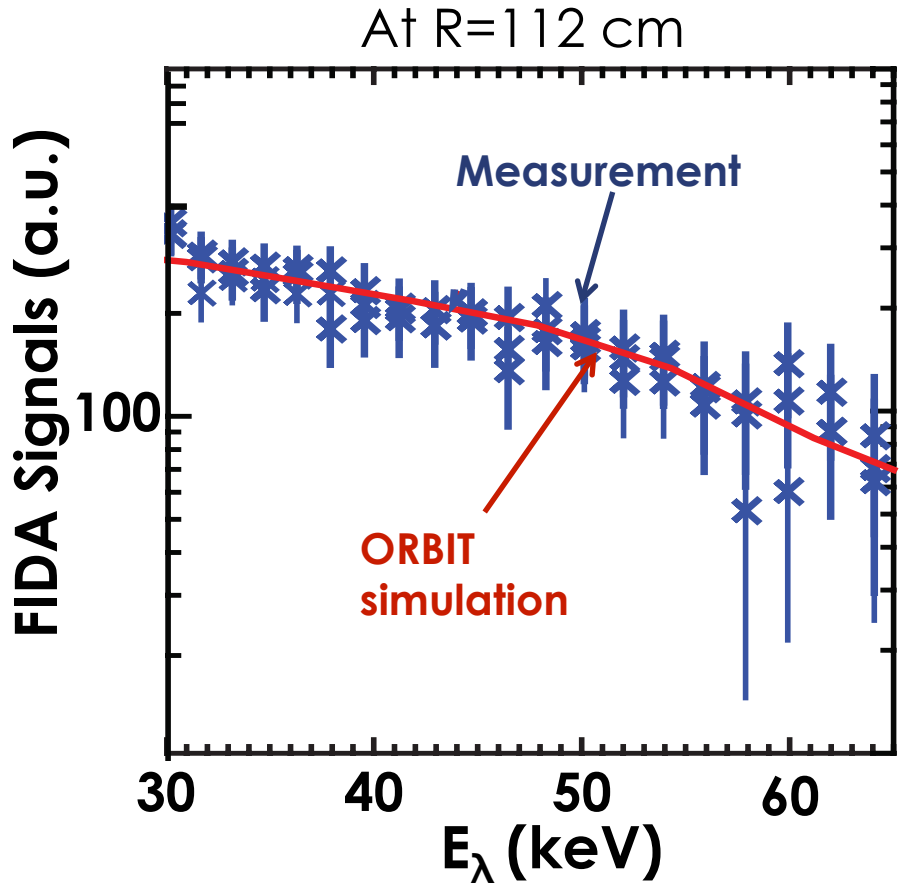
Simulated Distribution Is Passed to Synthetic Diagnostic Code to Compute Expected FIDA Signals



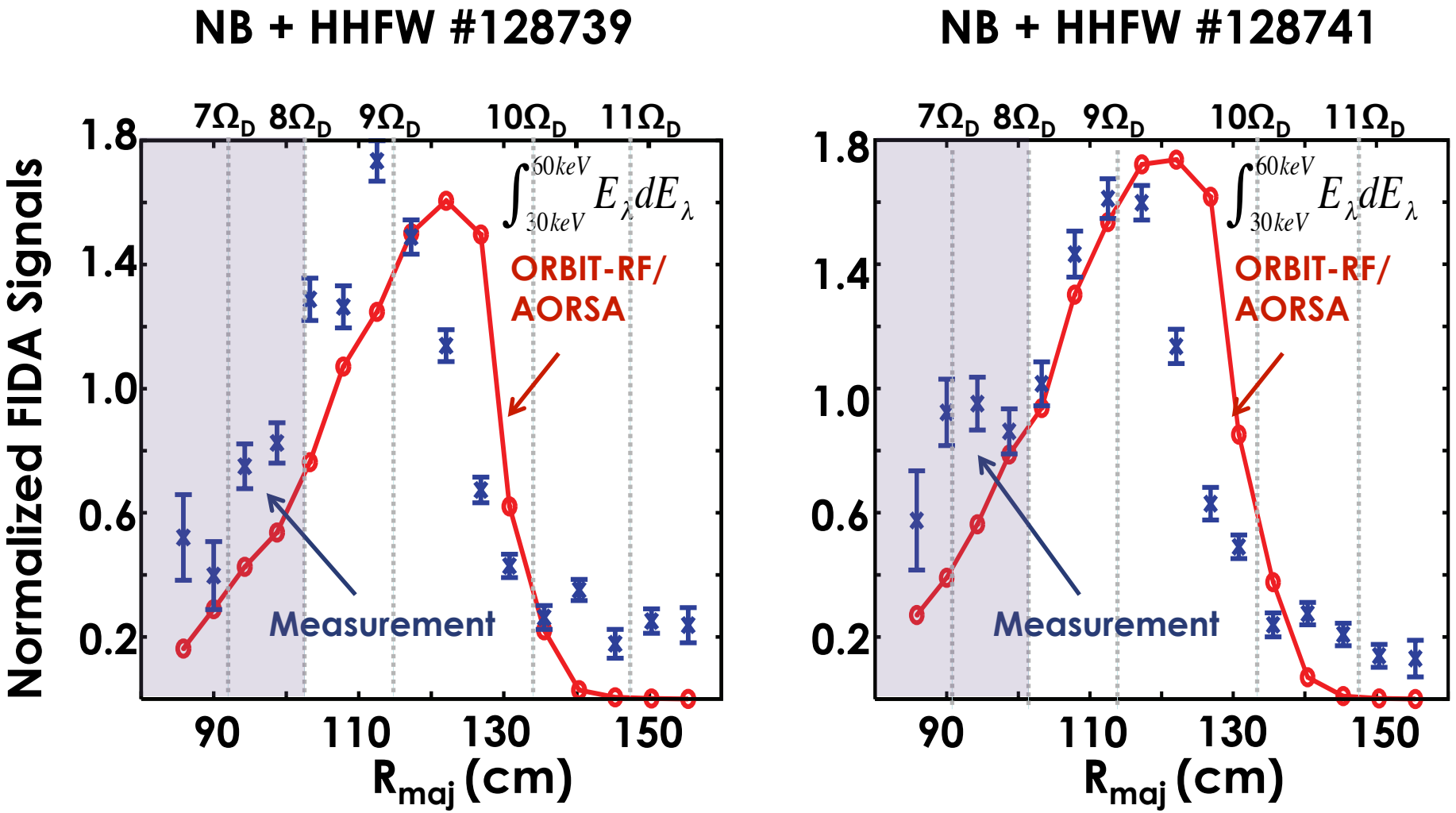
Good Agreements Are Obtained in Normalized Spatial Profile and Spectra at No HHFW Heating

- **NB discharge** P_{NB}=2.0 MW, E_{inj} =65 keV





HHFW Heating Simulations Predict Slightly Enhanced Outward Shifts of FIDA Signals



Summary

- **Finite-orbit Simulations of two similar NB + HHFW discharges (#128739 and #128741) reproduce qualitatively spectra and spatial profiles (outward shift) of measured FIDA signals**
  - Significantly Improved results against initial comparison result with zero orbit simulations (Podesta, 2009, Liu 2010)

- **Noted discrepancy in peak locations and at large R**
  - Prompt loss of fast ions in experiments
  - Inaccuracy in subtracting background signals
  - Simplified modeling on FW-particle interaction physics
  - Further sensitivity study

- **Need help to collect more experiments for further comparison study**