XP616 Summary: Moveable Glow Probe Evaluation

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All major target questions answered in XP 616 - Moveable Glow Probe Evaluation

- Does the moveable glow probe allow a reduction of the NSTX shot cycle? Yes
  - At least down to 12.5 min (6.5-7 min HeGDC) and maybe down to 10 min. (4-4.5 min. HeGDC)
  - Shorter glows require less fueling for long pulse
- Does a lower HeGDC pressure improve discharge performance? No
  - compared 2, 3, and 4 mTorr with 7 min. HeGDC
- Is the moveable glow probe more effective than the fixed wall probe for long pulses? No
  - Each allowed 1MA 1 sec pulses in double-null

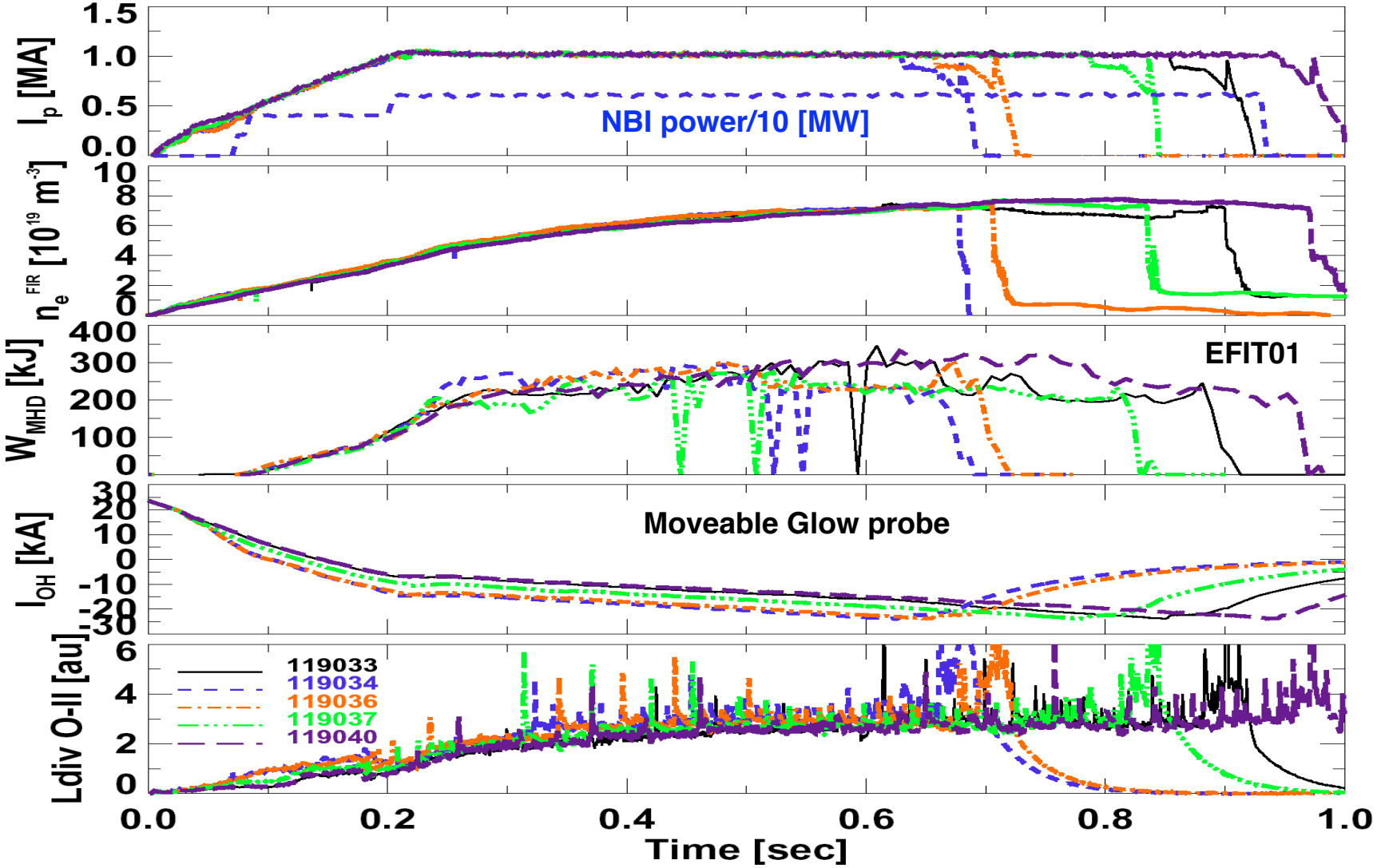
Several other conclusions from XP 616

- Plasma shape must be close to DN or biased slightly down to facilitate H-mode access (i.e. $\delta_r^{sep} \leq$ 3-5 mm)
  - ➢ Confirms conclusions from power threshold XP 505 which was at lower I_p, κ and δ
  - ➢ P_{LH} between 1 and 2 NBI srcs

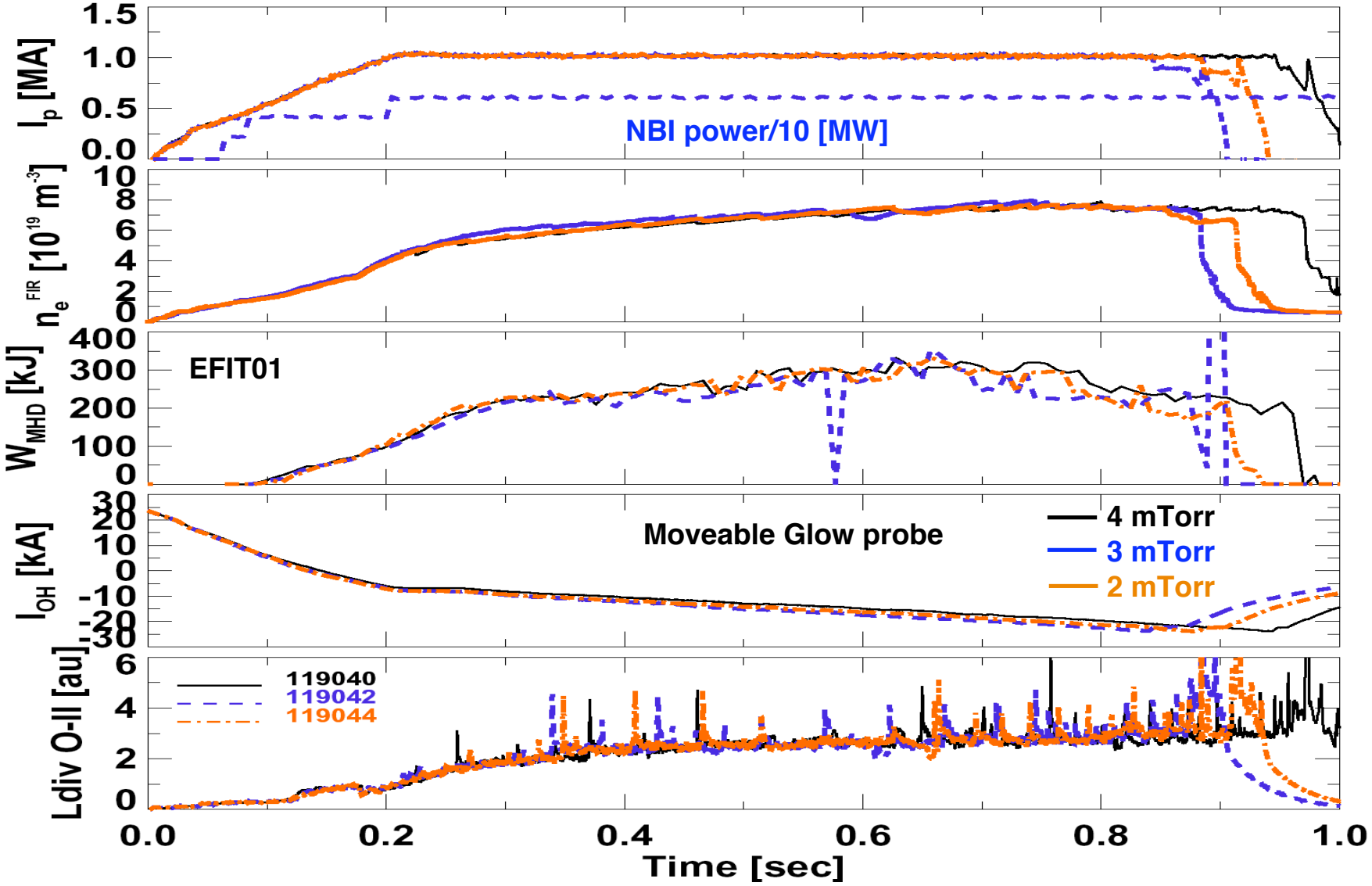
- Achieved 10 double-null discharges at 1 MA with I_p flattop past 0.8 sec and many in a row
  - ➢ Only 4 at the end of last year's run on different days
  - ✓ *Conclude that wall conditions were quite good very early into the run*

Reproducible long pulse discharges achieved with 6.5 min HeGDC between discharges

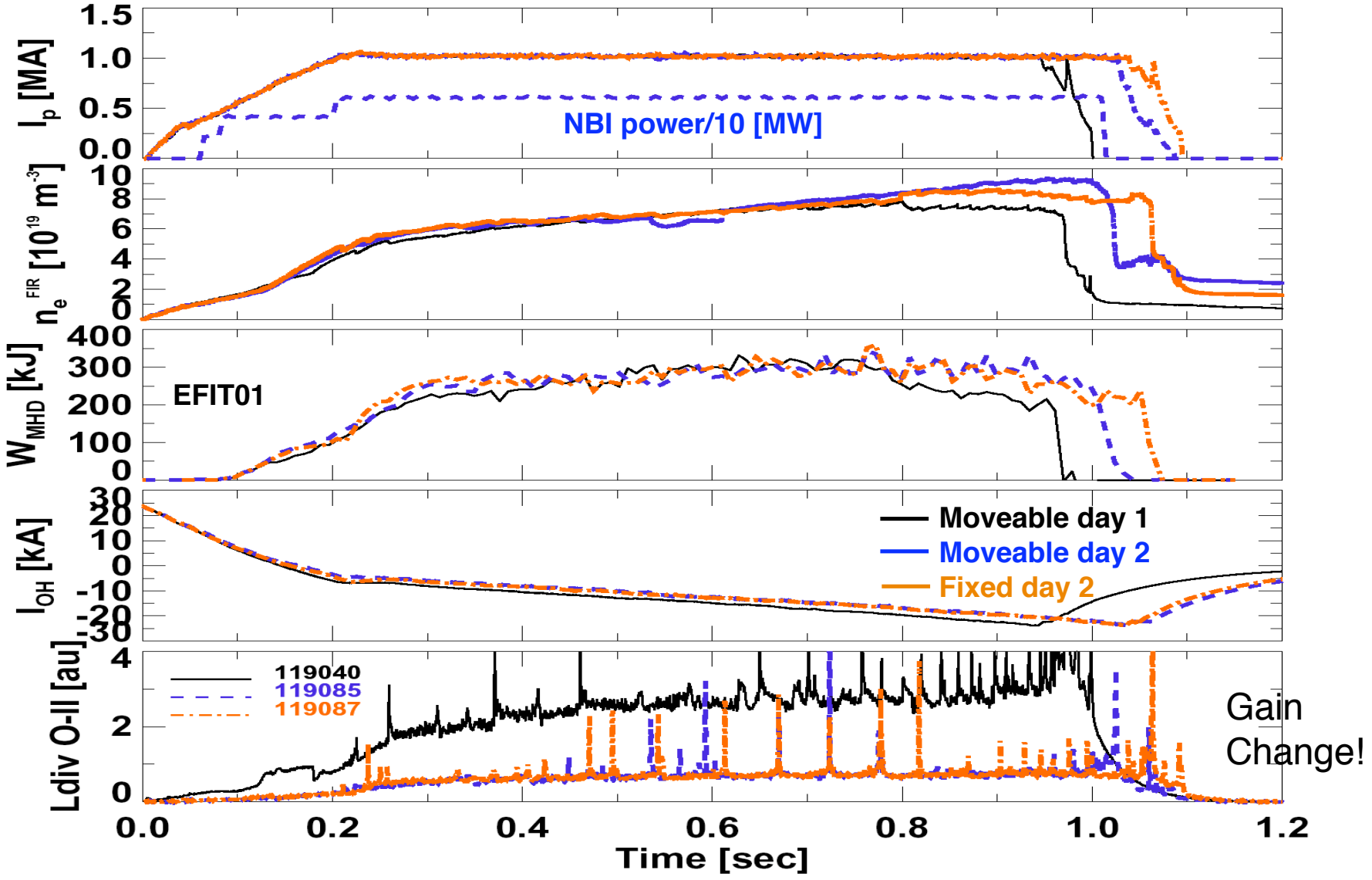
- Fueling reduced in steps from 119034-119040



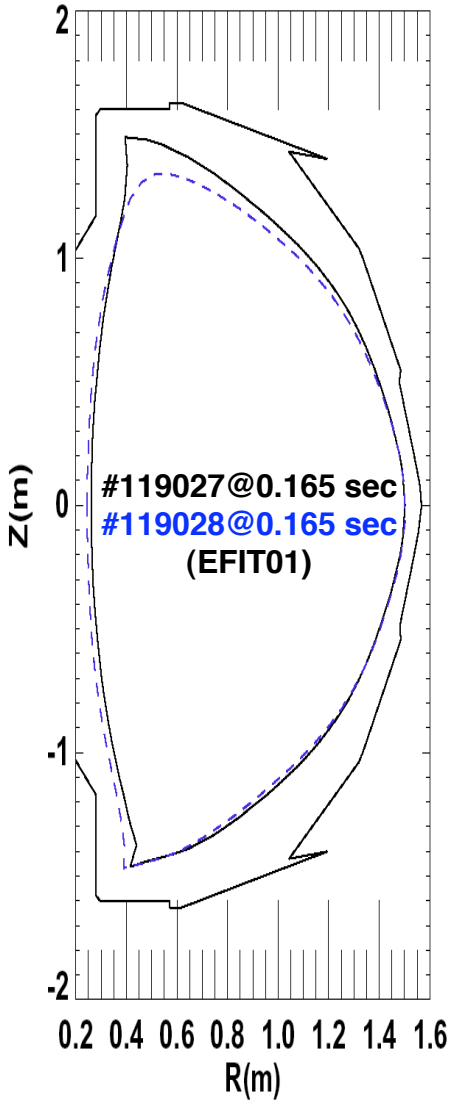
Discharge performance insensitive to HeGDC pressure (2-4 mtorr range)

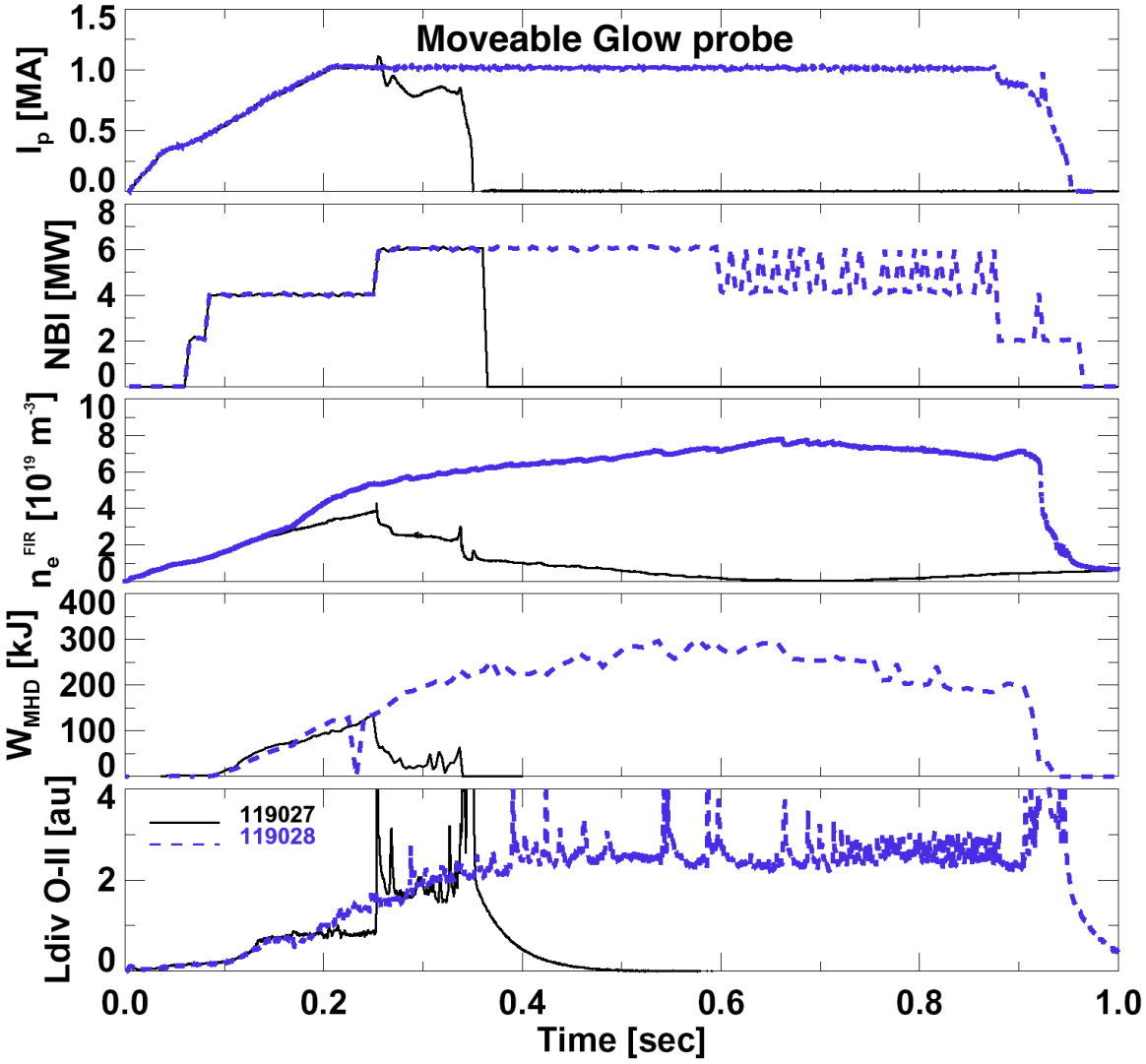


Similar long pulse discharges achieved with fixed and moveable HeGDC probes

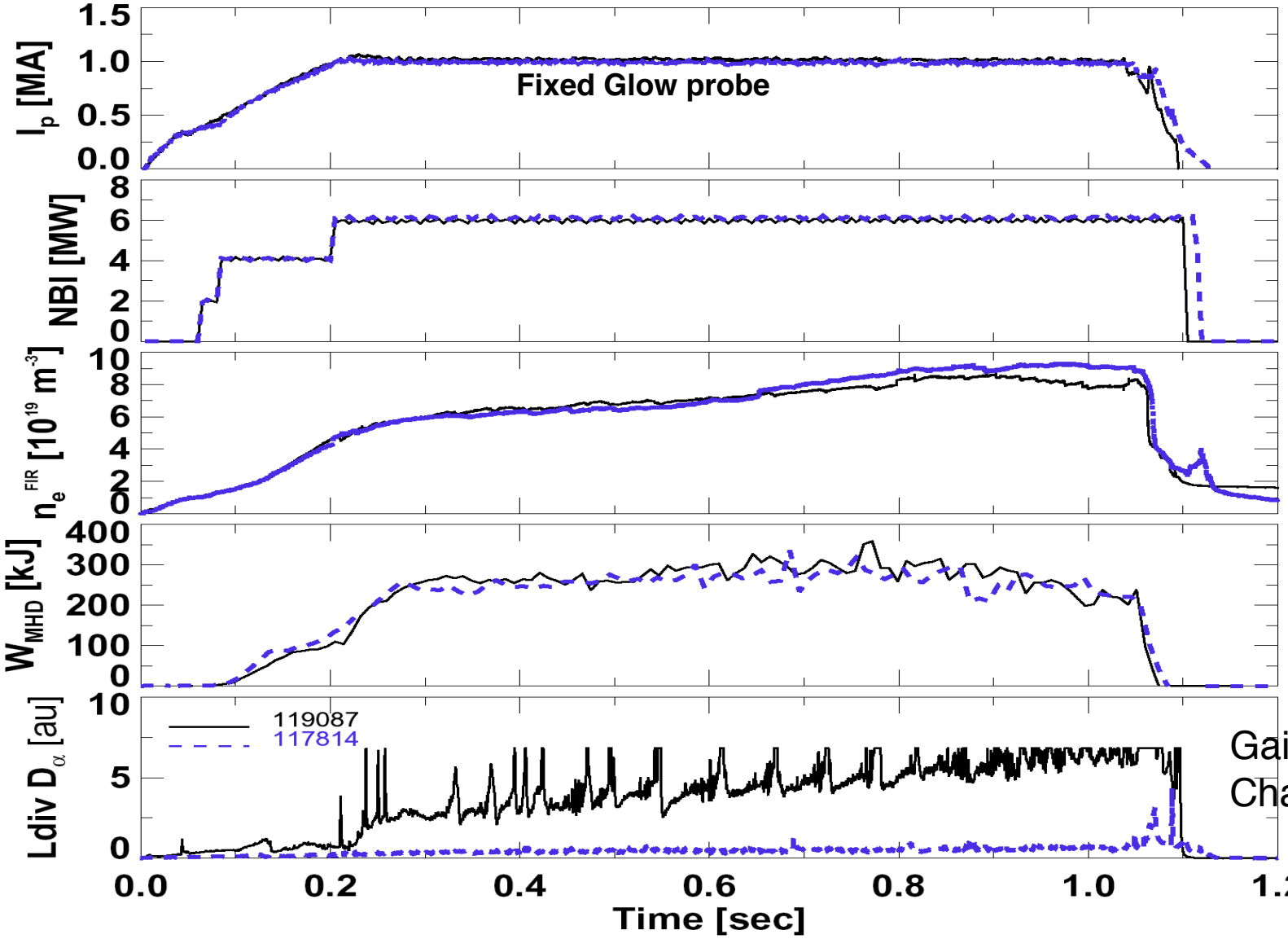


H-mode access easier as lower X-point becomes more dominant





Long pulse 1 MA discharge from this XP nearly identical to longest 1 MA discharge from last year



Gain Change!