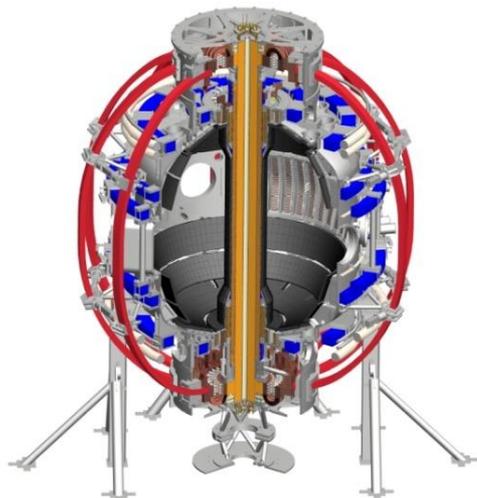


EPH access and long-pulse development

Coll of Wm & Mary
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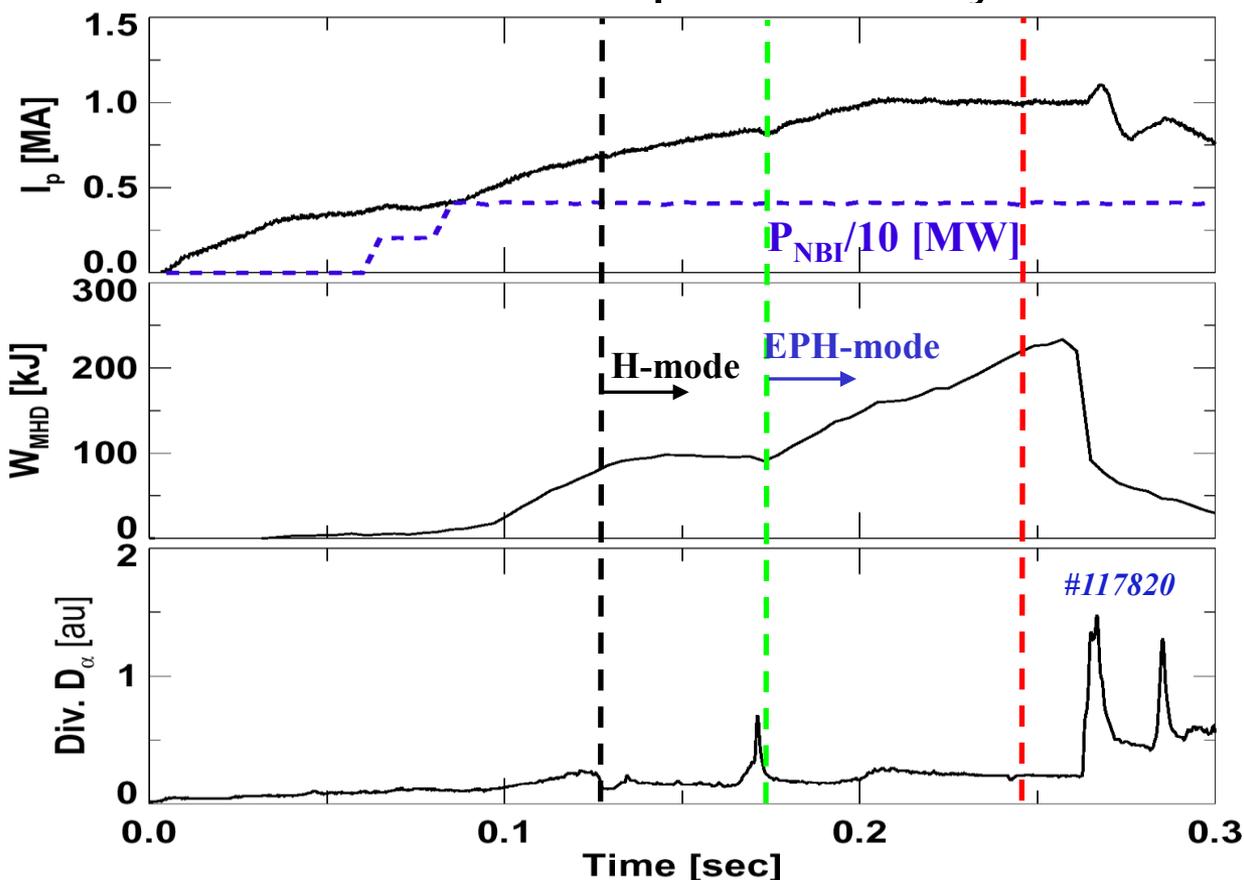
NSTX-U Research Forum
Princeton, NJ
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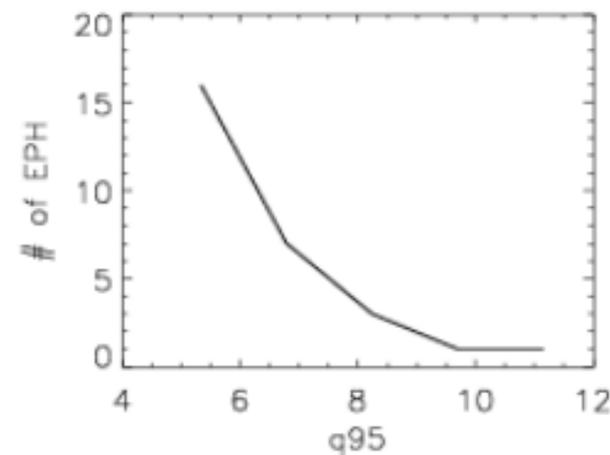
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Enhanced Pedestal H-mode (EPH): improved confinement mode with high T^{ped}

- Originally (but not exclusively) observed during current ramp
- Triggered by ELM-natural or induced
- Often leads to disruption shortly after EPH onset

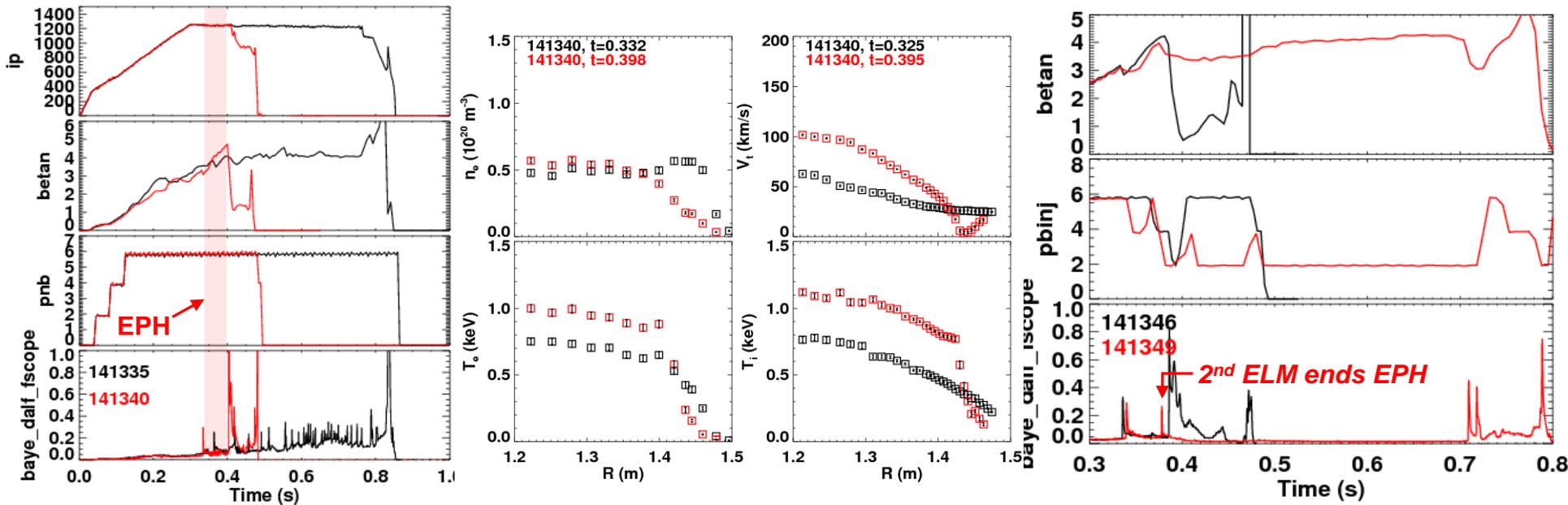


• *Natural EPH's seem to be more common at low q_{95}*



Previous progress on developing EPH for long-pulse (XP1064)

- Discharge identified with reliable natural EPH ($I_p=1.2$ MA, $q_{95} \sim 6$)
- β -feedback control attempted to extend EPH
 - Aggressive feedback parameters (gain and target beta) successful in rapidly dropping power following transition
 - Early disruption avoided, but second ELM ended EPH
 - Suggests more Li needed to avoid unwanted ELMs



New experiment will continue long pulse EPH development, probe q_{95} access condition

- 1 day total, with two parts
- Extend duration of EPH phase
 - First step: reproduce EPH
 - Previous effort reliably produced at low- q (141340); SGI and $n=3$ backup to trigger EPH
 - EPH occurs fairly often naturally-early/mid run period will hopefully produce cases that can be used as target
 - Add $n=1$ /beta feedback control to extend EPH phase
 - Increase LiTER evaporation rate to ensure ELM-free operation
- Vary q_{95} to test if low- q is strictly needed for access
 - Can be done simultaneously with feedback attempts, provided EPH is not actually lost
 - Use slight tweaks of I_p/B_t (eg 1.2/.45 \rightarrow 1.15/0.47)
 - Will also try ramping current down from 1.2 MA once in EPH
 - Test if EPH can at least be maintained at higher q_{95}
 \rightarrow low- q for accessing EPH, change to desired value