XP to Evaluate Daily & Between Shot Boronization

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- **Introduction**

- Typical Boronization (TMB) deposits 10 g over ~150 minutes.

- Question #1: Does more frequent, shorter Boronization improve reproducibility?

- Question #2: What is optimum tradeoff (frequency/duration of TMB) between impacting shot cycle and improving reproducibility?

- Question #3: Is a short morning Boronization sufficient?

- Question #4: If Morning Boronization is good, is Between Shot Boronization even better?

Procedure

1. Perform 15 min (1 g) Boronization in the early morning, followed by a 30 min HeGDC to remove codeposited Deuterium.

2. Run Fiducial (LSN) 10 shots with 12 min HeGDC between shots.
Measure: $n_e$bar, dn/dt, D_{α}, BII, CIII, OII,
and important ratios: OII/CIII & CIII/BII (Filterscopes), OV/CIII (SPRED)

3. After evaluation of the Morning Boronization, try Between Shot Boronization to determine effect.
Apply Boronization as follows: 2 min HeGDC, then 5 min TMB, then 6 min HeGDC.

4. If 5 min Boronization not sufficient, try 15 min Boronization and measure duration of effect.

5. If 5 min Boronization sufficient, how much HeGDC is needed after 5 min Boronization?
- If $D_{\alpha}(n_e)$ is too high after 5 shots, increase HeGDC to 10 min, and repeat 5 Fiducials.
- If D_{α} is lower, try 2 min Boronization as follows:
  2 min HeGDC, then 2 min TMB, then 8 min HeGDC, repeat 5 Fiducials

6. If 2 min Boronization sufficient after 5 Fiducials, go to 1 min TMB, repeat 5 Fiducials
- If not sufficient, and if 5 min OK, try 3.5 min TMB, repeat 5 Fiducials

Requested Diagnostics: Fiberscopes + HAIFA, interferometer, SPRED, MPTS, Magnetics, Fast Camera.