

## Run 2b (Mar 02 – Mar 13/21)

Goal: measure NMR signals from a short- $T_1$  HD target that rapidly reaches an equilibrium polarization determined by the field and temperature, and use these to deduce the HD temperature under different beam conditions and duty factors

- Monday, Mar 1: short- $T_1$  HD target loaded into IBC
- Tuesday, Mar 2: cave-2 roof reinstalled; re-established orbit through IBC axis
- UITF running Mar 3 - 13
  - overall, UITF beam is much more stable than Fall/20, provided VTA is not drawing LHe !
  - UITF running conditions:
    - CW
    - USER MODE with  $df = 2/3$  (3.33ms ON + 1.67ms OFF)
    - USER MODE with  $df = 1/3$  (3.33ms OFF + 1.67ms ON)
- - NMR noise is significant when the UITF is operating
  - ↔ each beam condition required hundreds of NR sweeps to average out noise
  - ↔ ~ 1 day / point
- extract HD target from IBC: Monday 3/15; begin warmup of IBC

- from Run 2a (Nov/20):  
 $E_{\text{loss}} = 0.74 \text{ MeV}$   
 $= 0.74 \text{ mW/nA at } 9.7 \text{ MeV}$
- initial Run 2b observations:
  - T(HD) ~ order of magnitude larger than expected
  - ↔ unpaired electrons are partially unpolarized
  - ↔ will decrease  $T_1$  of frozen-spin targets
  - reduced  $df$  with the same average  $\langle I_e \rangle$  results in higher temperatures than CW
- analysis is ongoing; we may be able to extract info on the time constant for heat removal from HD

