Run 3 UITF status update –Dec 19/20

- **the last week of run 3:**
  - measured dP/dt under different holding fields
  - new USER-MODE utility to blank beam 10 x faster than previous tests did not converge

- *Run 3 ended Dec 17th*
- *Dec 18: cave-2 roof removed*
- *Dec 18: target extracted*
- *Dec 19 – 21: bringing cryostats to a safe state for the shutdown*

Run 3 UITF status update –Dec 19/20

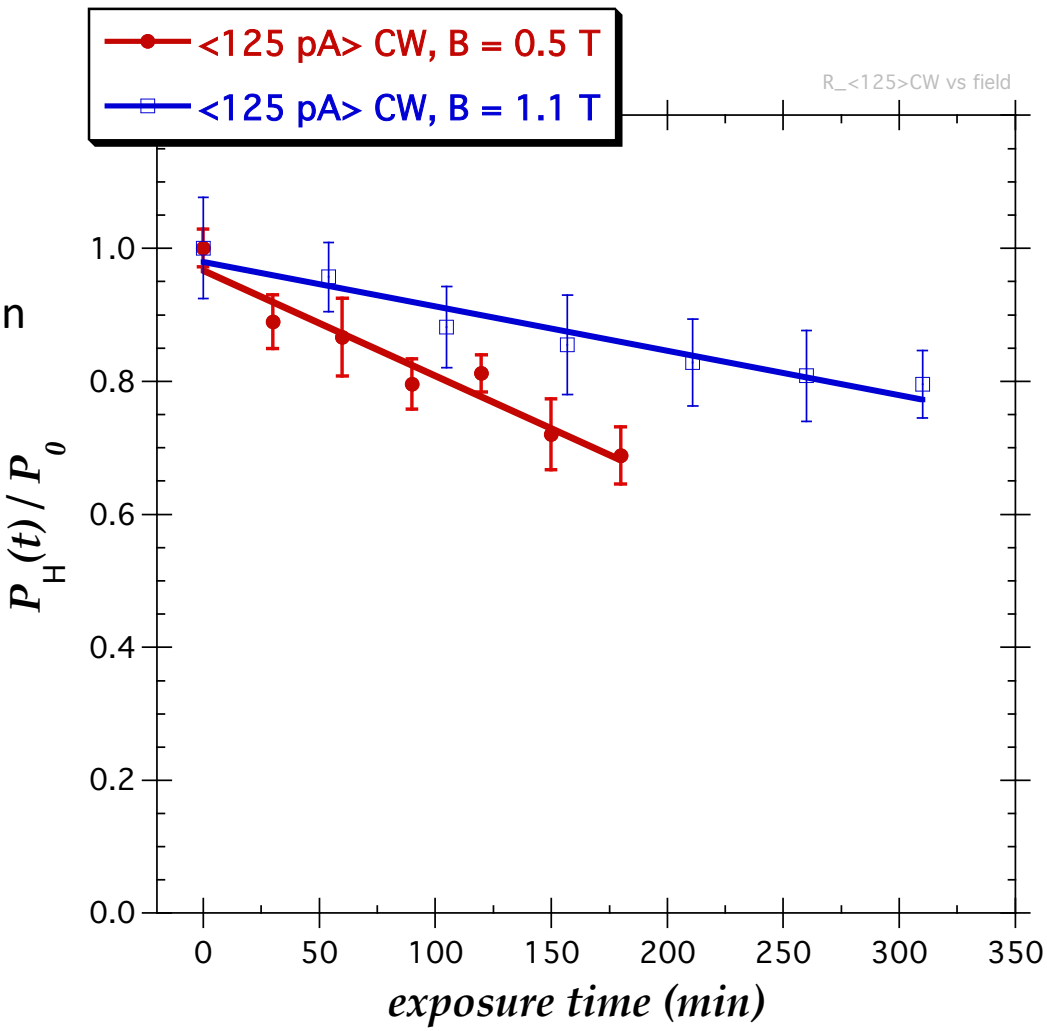
- **the last week of run 3:**

- dP/dt under different holding fields:

  - same current ⇔ same temperature

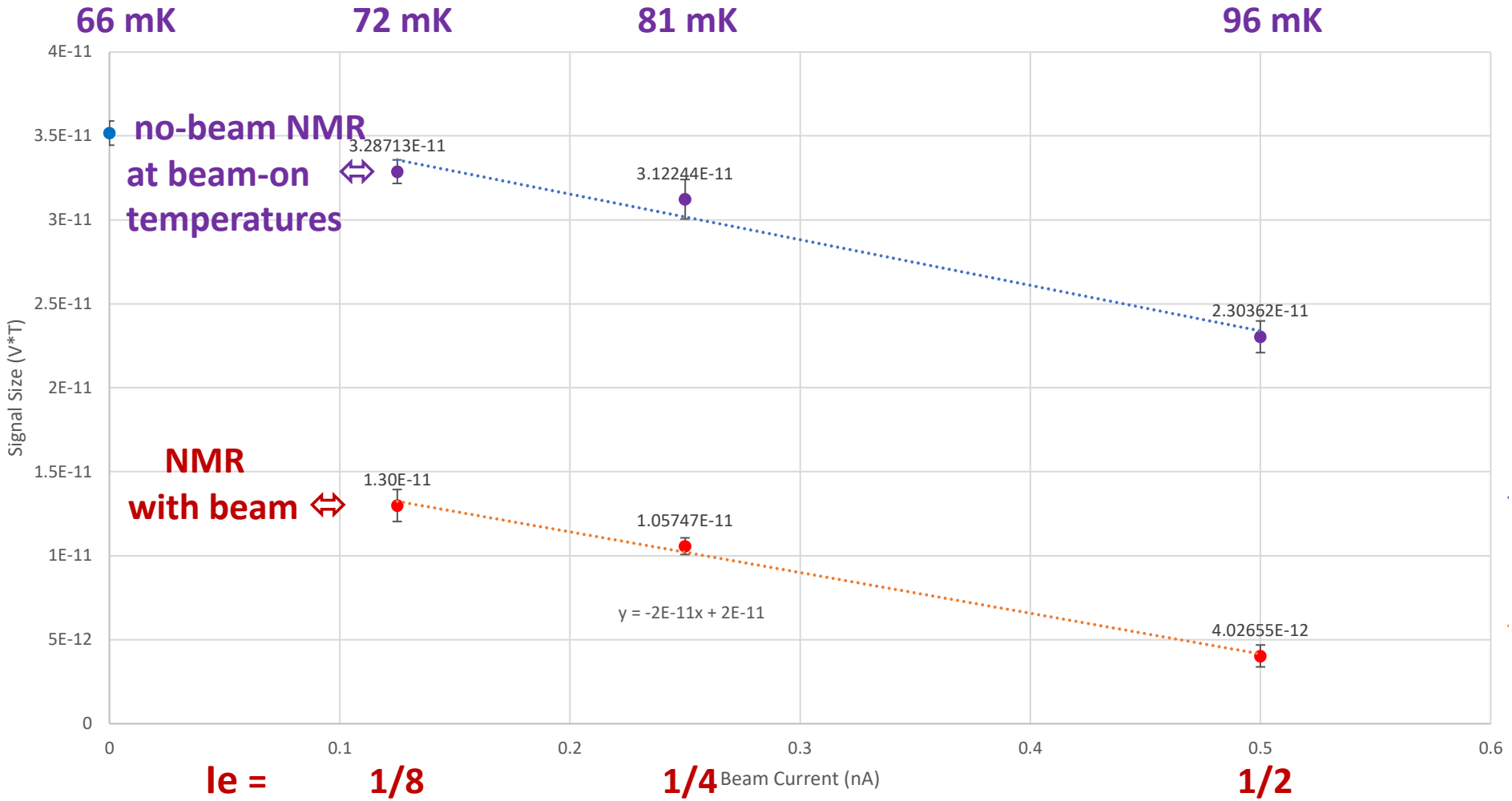
  ⇔ different atomic electron polarization

- large difference
  → lower atomic electron polarization than expected from T_{IBC} (73 mK)



Run 3 UITF status update –Dec 19/20

- **from run 2 with a short T_1 target:**

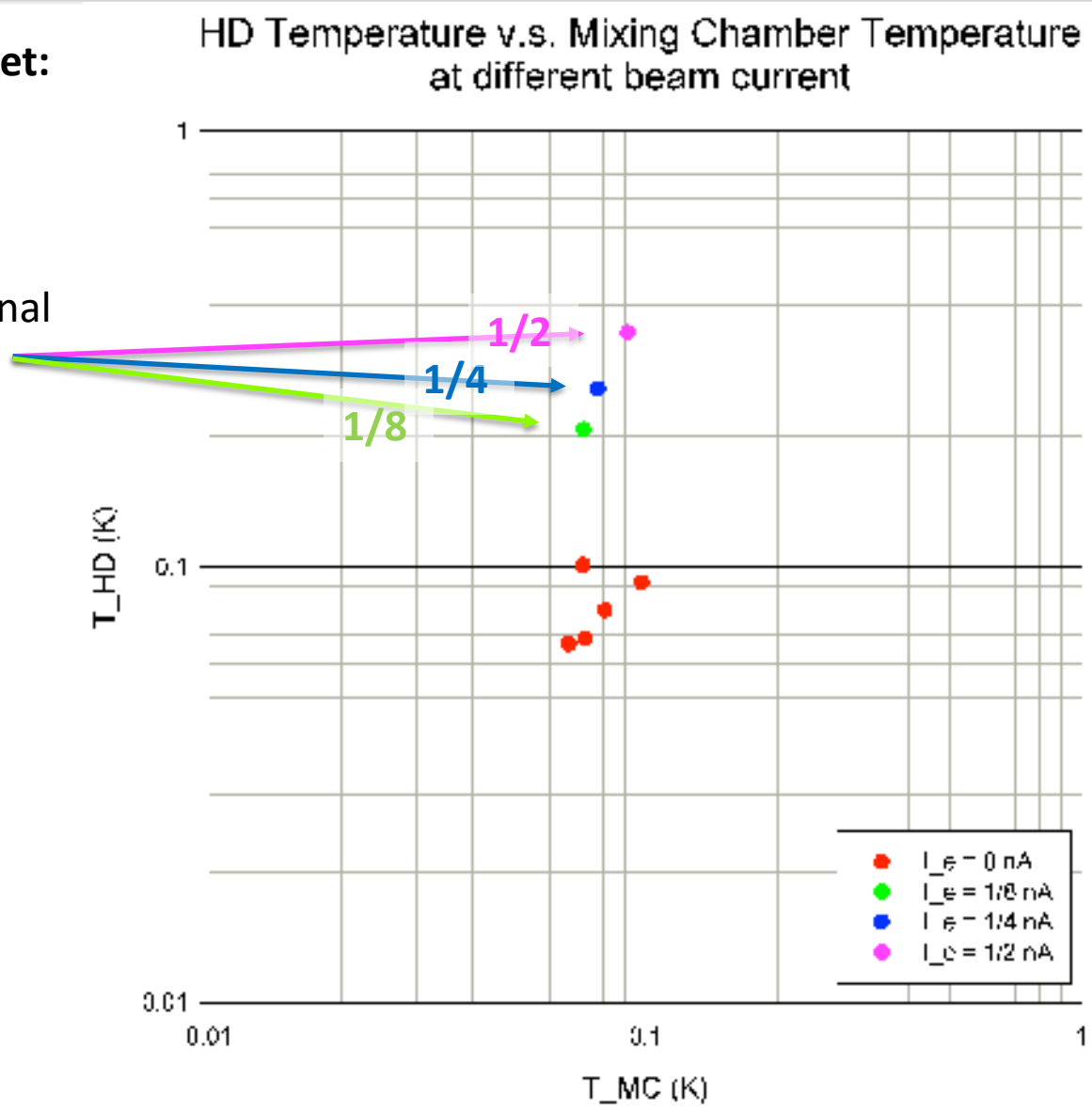


Run 3 UITF status update –Dec 19/20

- **from run 2 with a short T_1 target:**

- using Thermal equilibrium signal

  to deduce HD temperatures



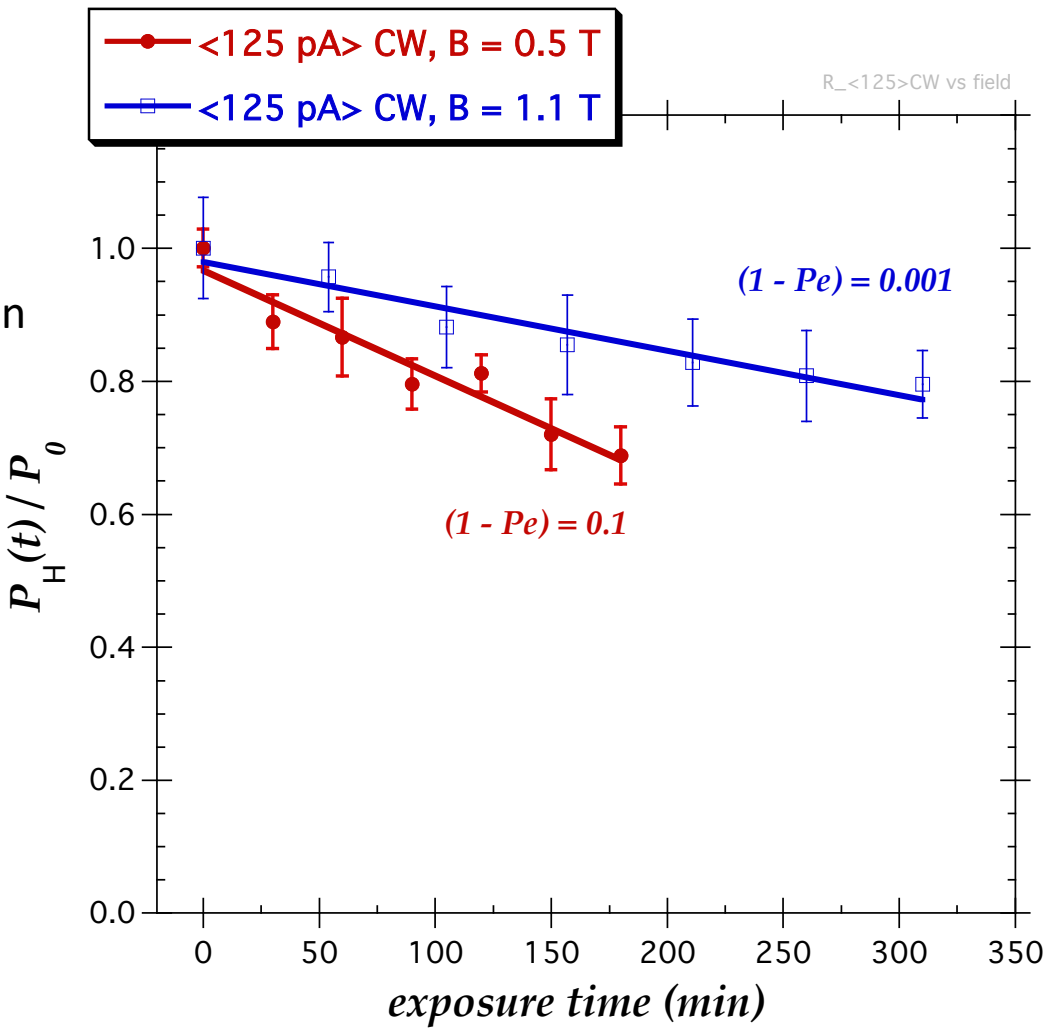
Run 3 UITF status update –Dec 19/20

- **the last week of run 3:**
- dP/dt under different holding fields:

  - same current ⇔ same temperature

  ⇔ different atomic electron polarization
- **High HD temperatures (> 200 mK) result in only partial atomic electron polarization**

  ⇔ significant dP/dt



Run 3 UITF status update –Dec 19/20

- **possible source of the high HD temperature with beam:**

  1) the conductivity of the Aluminum wires at 100 mK is a lot worse than expected

  - there is no direct data in the literature; it's complicated, but possible to measure
  - if so, there might be some path to improvement

  2) the conduction of heat through the HD to the wires via phonons is very poor

  - if so, the options are very limited. (A faster raster might help to some degree.)

- in either case, eHD remains an R&D project that is not at this time ready to support RG-H

Run 3 UITF status update –Dec 19/20

- Summary of Run 3 results will be discussed in more detail on Wednesday, Jan 6th/21

Our sincere thanks to all those who took remote shift to log the IBC parameters.

Your help has been invaluable !