



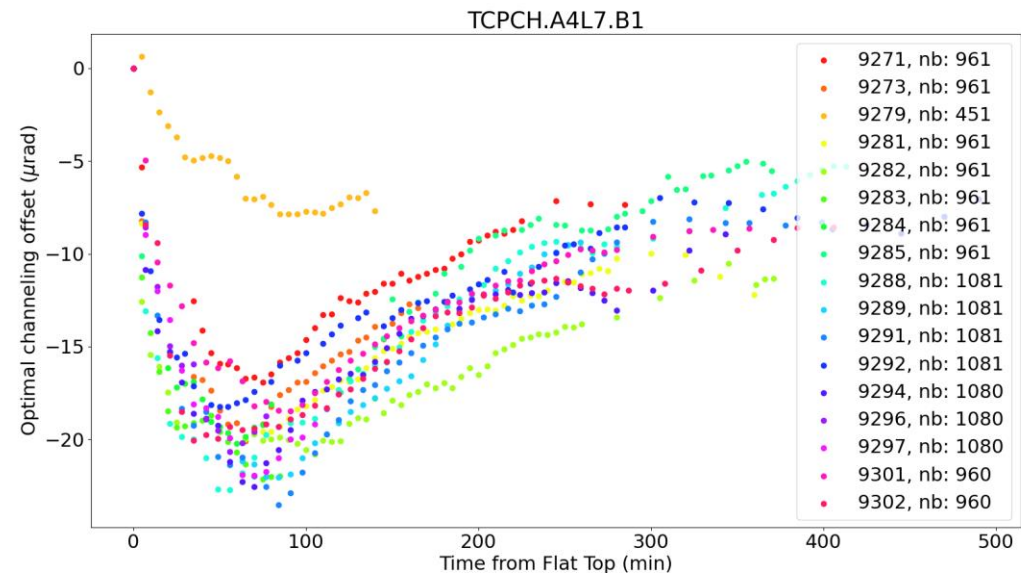
# MD13703: ML assistant crystal channeling optimisation

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# Motivation

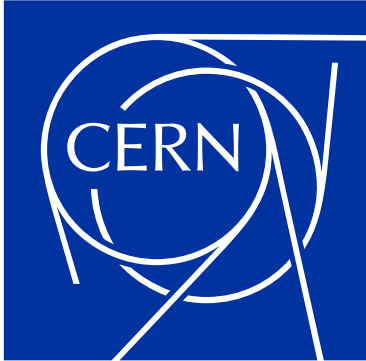
- **Crystals during the 2023 ion run experienced a drift**, which resulted in crystals losing channelling if not mitigated.
  - Root cause under investigation, and if a solution is based on a mechanical upgrade, it would be conducted in LS3.
- **Ensure crystals maintains channeling** to reach the designed 20MJ beam energy.
- Software completion targeted for MD5.
- **Goals:**
  - Validate FESA control functions and software interfaces.
    - Testing of real-time trims applied to the crystal goniometers.
  - Validate ML optimisation technique at different cycle stages.



Courtesy of D. Mirarchi ([CoIUSM #178](#))

# Beam requirements and plan

- **Up to 30 pilot bunches for both beams**, respecting the setup beam flag.
- **Plan:**
  - Test control architecture and FESA functionality for crystal control. Maintain channeling condition while offsetting the crystal orientation to validate the model and control architecture.
  - Based on testing at injection perform ramp up and test control architecture during the ramp without fixed energy levels.
  - Reach flat-top and repeat validation tests with the same beam if enough intensity is left.
  - If time permits acquire loss maps.
- **Estimated duration: 8h**



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