

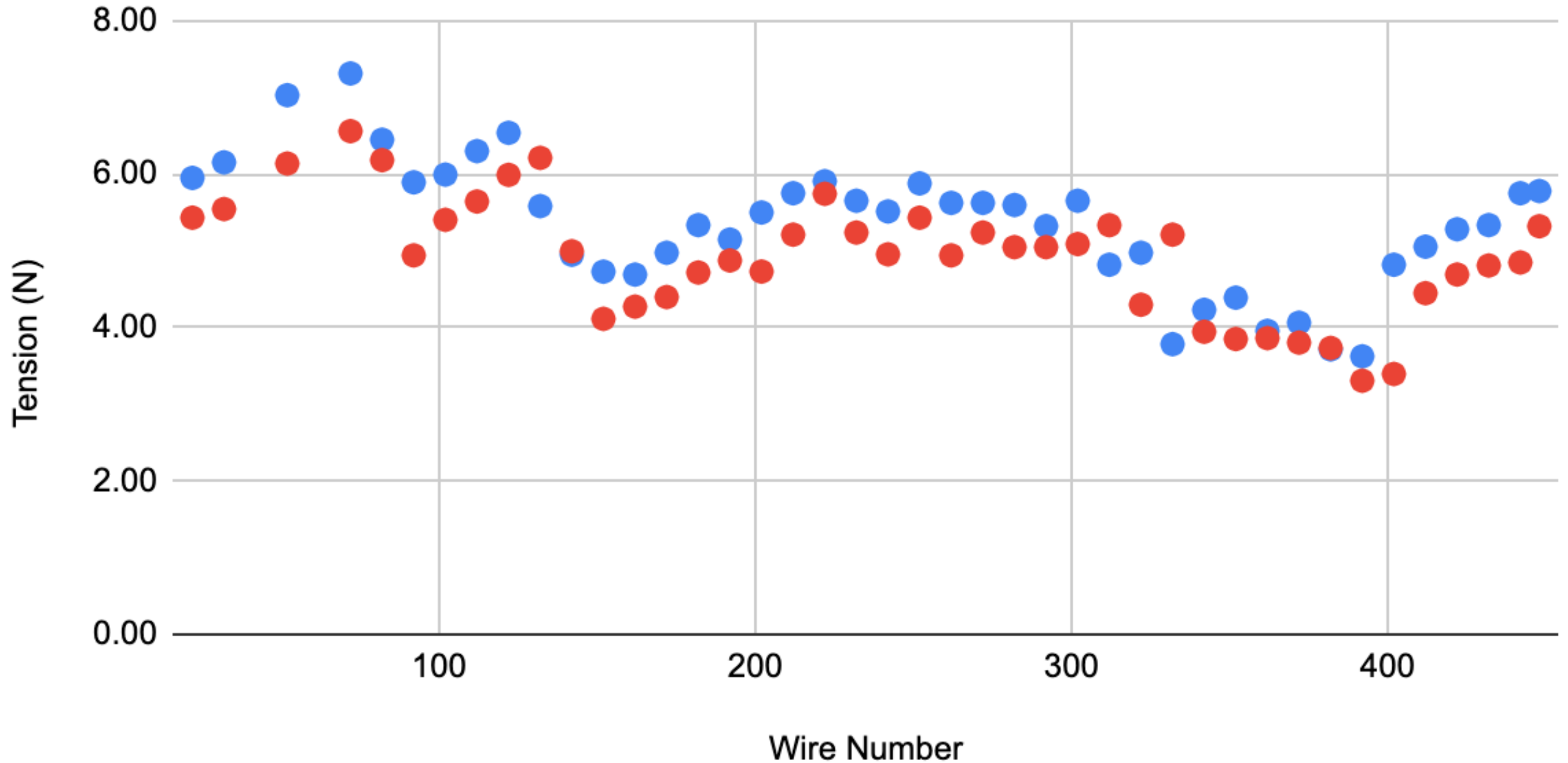
APA7 Tension Measurements at CERN

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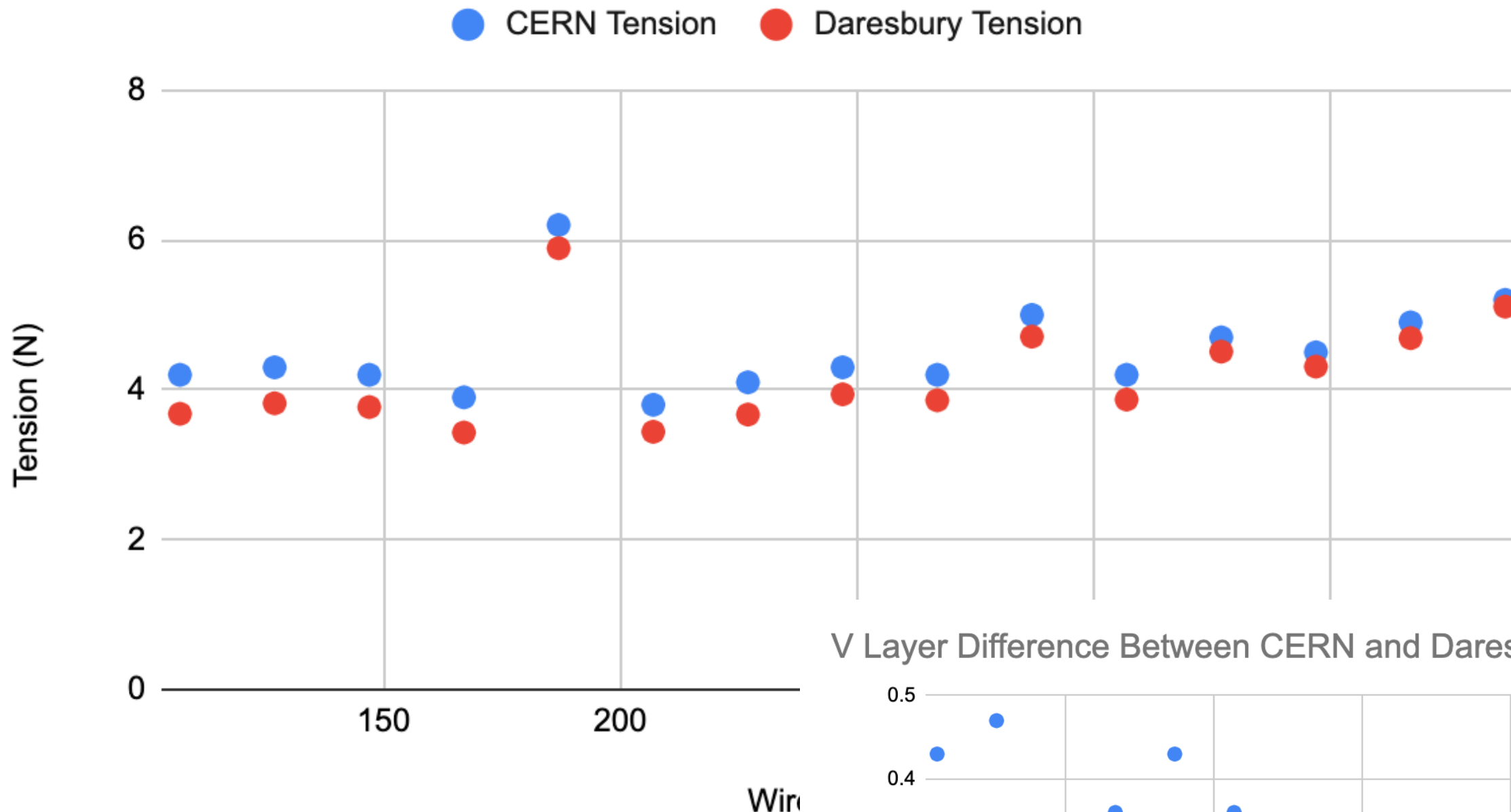
Tension vs Wire Number - X Layer - Zone 1

● CERN Tension (N) ● Daresbury Tension (N)

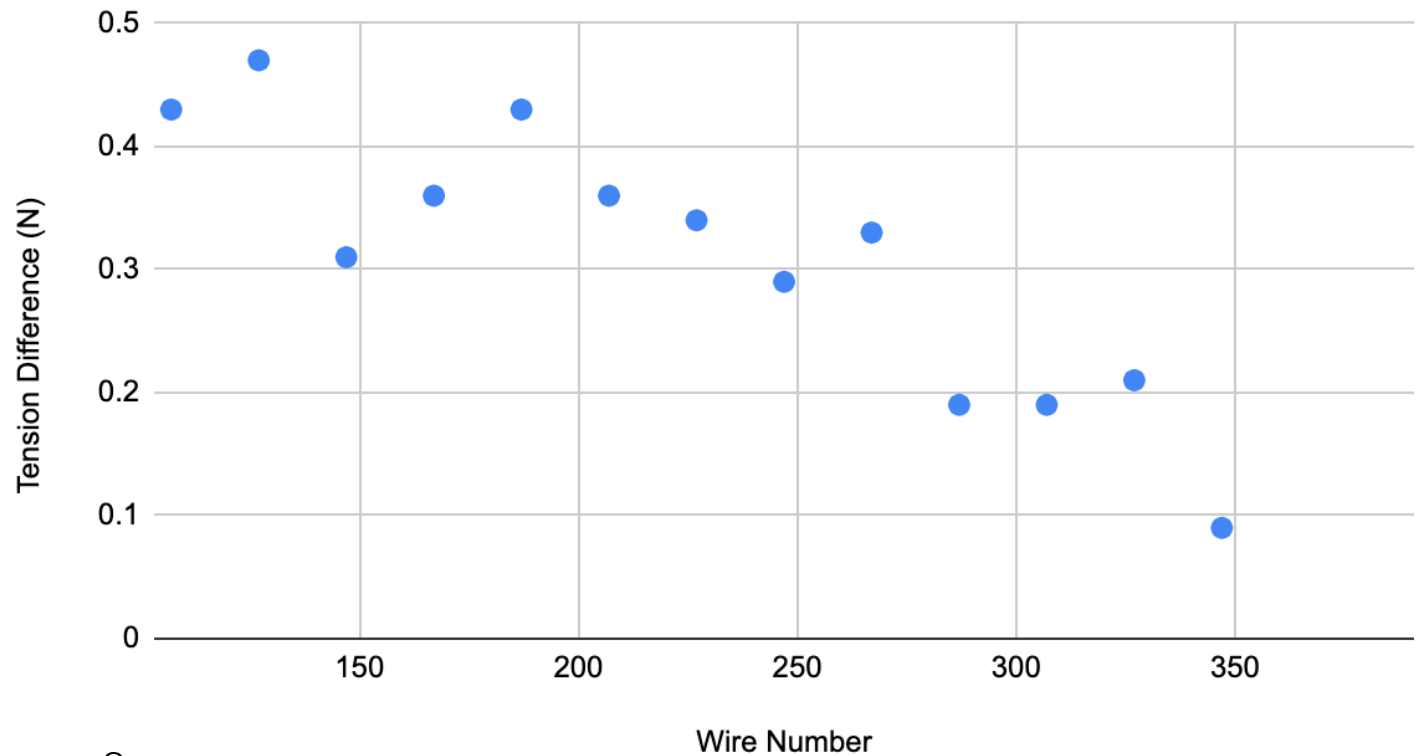


Average **increase** of (0.40 ± 0.07) N compared to Daresbury measurements.
CERN measured in Zone 1, Daresbury measured in Zone 2.

Tension vs Wire Number - V Layer - Zone 1



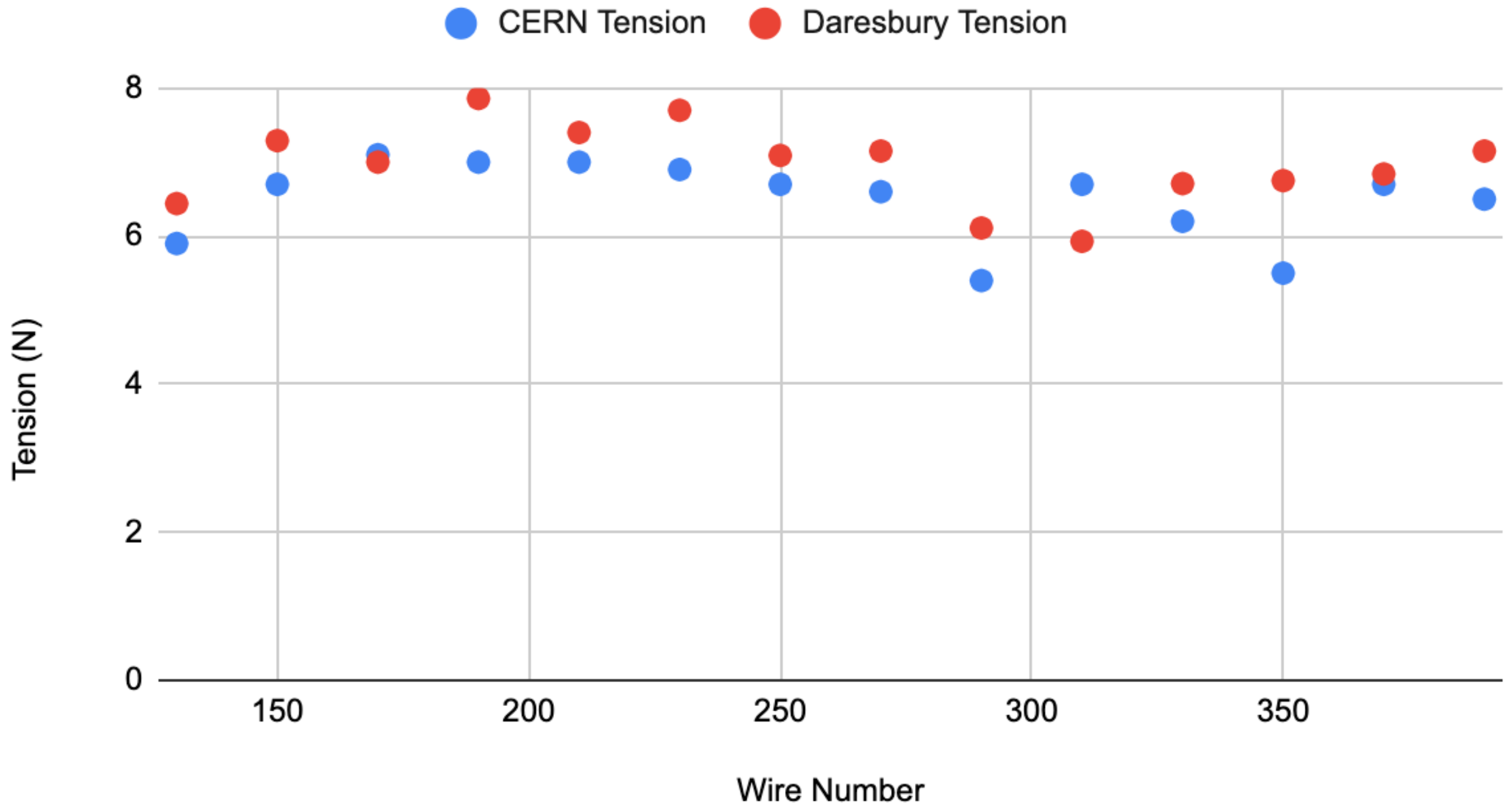
V Layer Difference Between CERN and Daresbury Tensions



Average **increase** of (0.33 ± 0.03) N compared to Daresbury measurements.

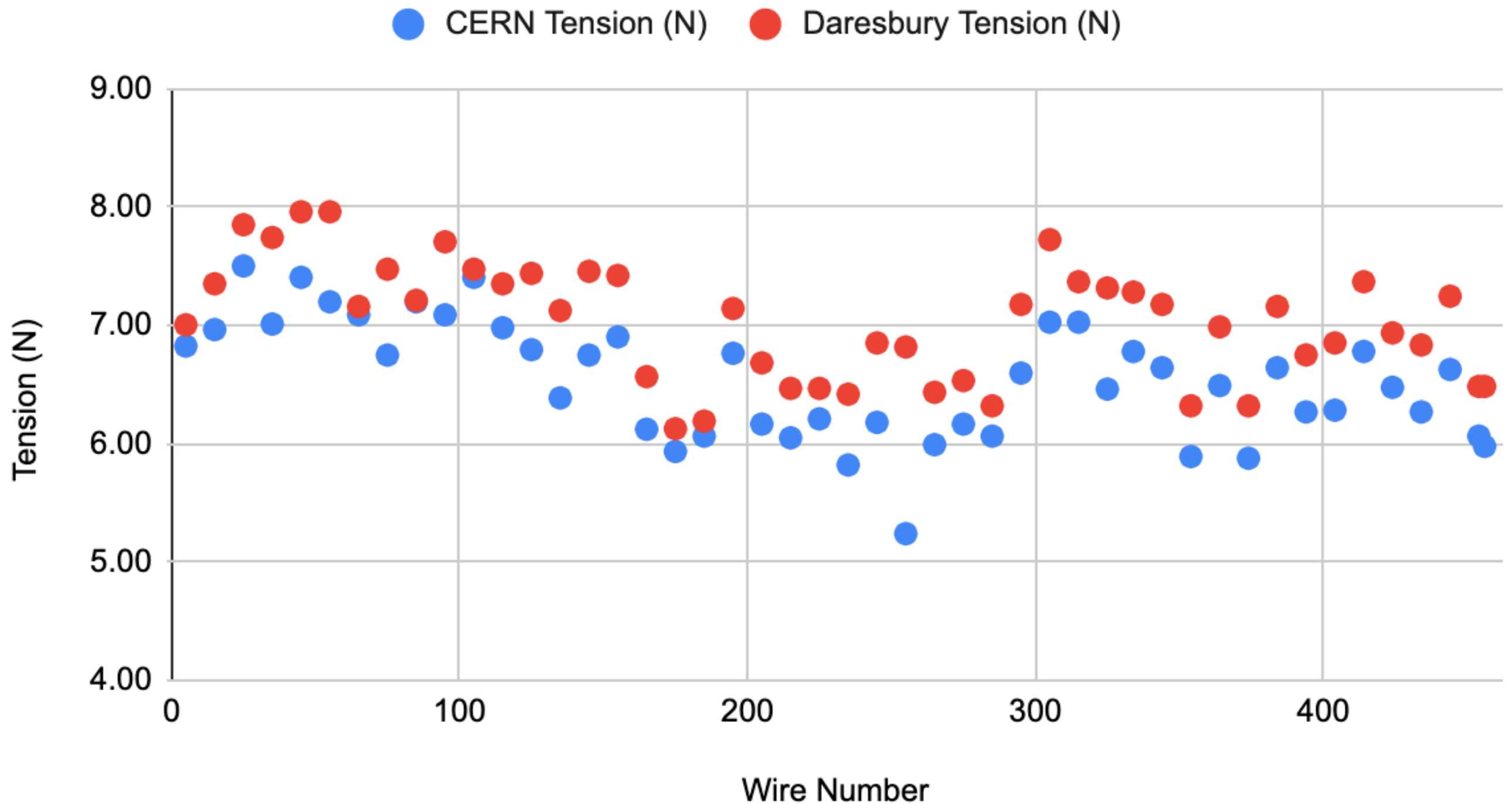
Increase decreases as you go across the APA.

Tension vs Wire Number - U Layer - Zone 1



Average **decrease** of (0.47 ± 0.13) N compared to Daresbury measurements.

Tension vs Wire Number - G Layer - Zone 1



Average **decrease** of (0.50 ± 0.04) N compared to Daresbury measurements.

Note, for G layer the Daresbury measurements were taken at time of winding. For other layers they were taken after all wires had been wound, allowing for relaxation.

CERN measurements taken in Zone 1, Daresbury in Zone 5.

Summary

- Tension measurements made on all 4 planes of wires on APA7. All measurements were made from Zone 1 of Side A of the APA while it was hung vertically next to the cold box at CERN.
- Average tension of X and V layers **increased** compared to previous tests at Daresbury in Spring 2019, the average tension on the U layer **decreased**.
- Average tension of G layer also decreased, but the Daresbury measurements for that layer were made at the time of winding. The tension would then expect to drop after the wires relax, and then increase when turned vertical.
- The Spring 2019 tests were made 2-4 months after the wires had been wound (longer for X, shorter for U) which allowed the wires to relax, unlike the G layer measurements.
- Data from the plots shown here can be found here: <https://docs.google.com/spreadsheets/d/1TCYW8BC0BnSrMArIAcr36FSqMRHLthbKWn8YzzkyZfE/edit?usp=sharing>