

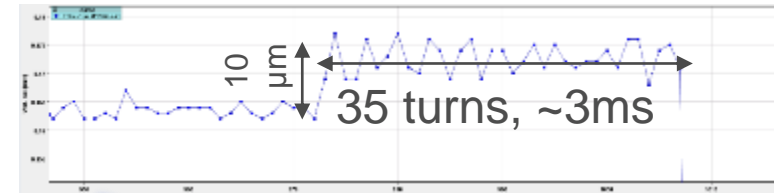
# MD#1826: Measurement of QH vertical kick

## • Introduction:

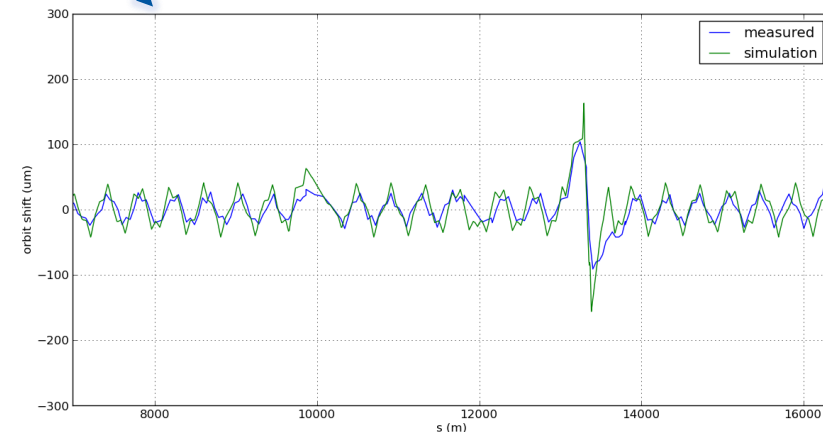
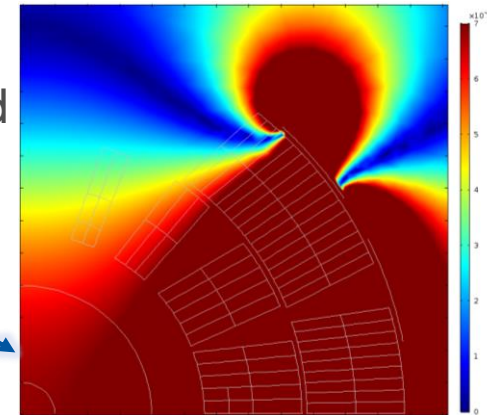
- During training and beam induced quenches a vertical orbit oscillation was observed, the beam stays in the machine for a few ms afterwards.
- Quench Heaters are thought to be the source of this kick.
- The simulations fit the orbit measurements.

## • Merit of the MD:

- Confirm the Quench Heaters are the cause.
- Measure amplitude at injection and dump delay in case of spurious firing.
- Verify polarity of the connection on critical magnets and dependence on beta function.
- This is an important input for the magnet protection the HL magnets protection (11T, triplet, ...)



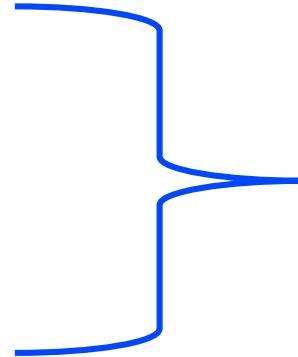
QH induced  
 $B_x = 0.7$  mT



# MD#1826: Procedure to follow

- **Procedure:**

- Over-inject a nominal per beam.
- Fire the QH (at injection energy).
- Measure orbit and dump delay.
- Quench recovery.
- Short pre-cycle.



Between  
1 and 2  
hours

- **Preparation, special settings & readiness:**

- Firing the QH can be done by simulating a quench signal via the QPS.
- Just like during the HW commissioning but with beam.
- No other special settings required.

- **Time Requested: 3 magnets x 2h = 6h**

- **Foreseen for MD block 5: Friday 28 October 3-8AM**

# MD#1826: Magnet to be used

- **Magnet Protection aspect:**

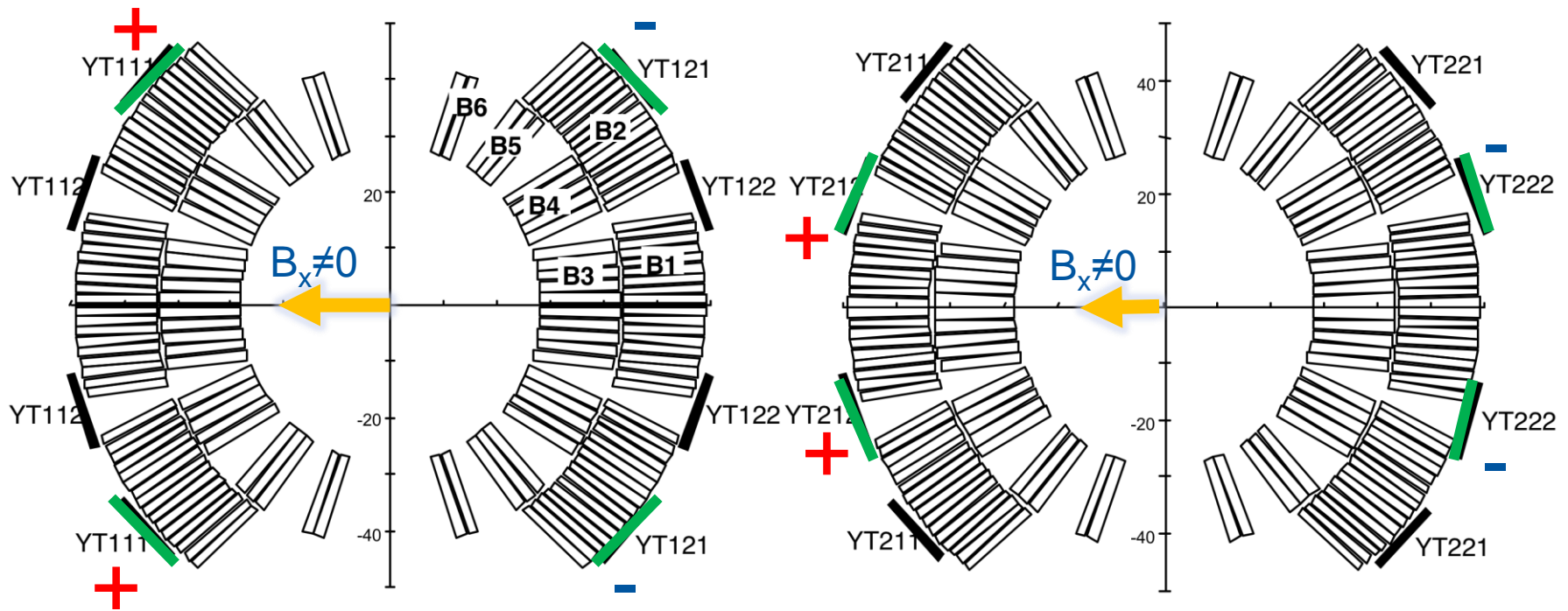
- **MBC28L5** is known to have QH connected in a skew dipole way. We start from this one and explore the half-cell around it, but:
  - MBA29L5, #2151, 2 propagated quenches @3538 A & 5234 A
  - **MBC28L5**, #3211, beam induced quench @10971 A
  - MBB28L5, #2148, training quench @10942 A, propagated @6530 A
  - **MBA28L5**, #1186, 2 propagated quenches @6705 A & 2552 A
  - MQXBL1 (close to 31L2), MQXBL2 (same plus recent MKI erratic)
  - **MQXBL5**, OK
- If there is time:
    - **MQXBR5**, OK
    - MB.A27.L5, lots of quenches, not OK
    - **MBA31L5**, #3207, training quench @10728A, propagated @549A



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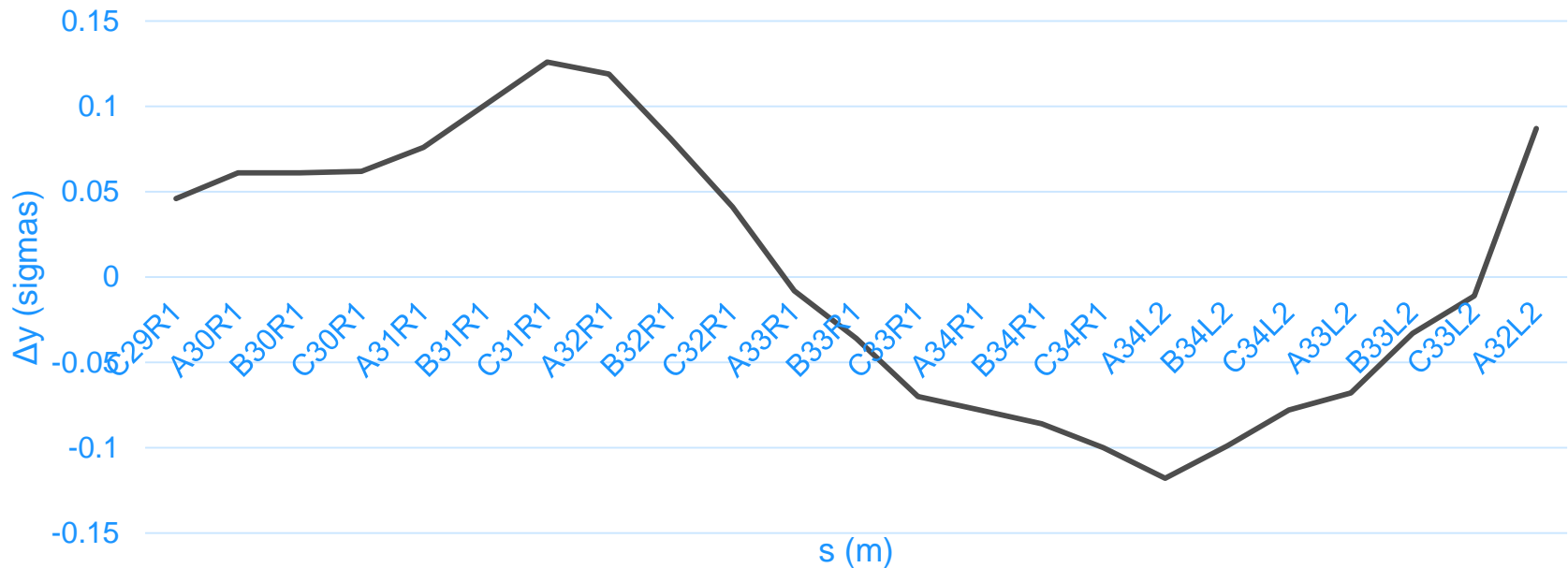
# MD#1182: Measurement of QH vertical kick

Most common connection scheme  
for the main dipole



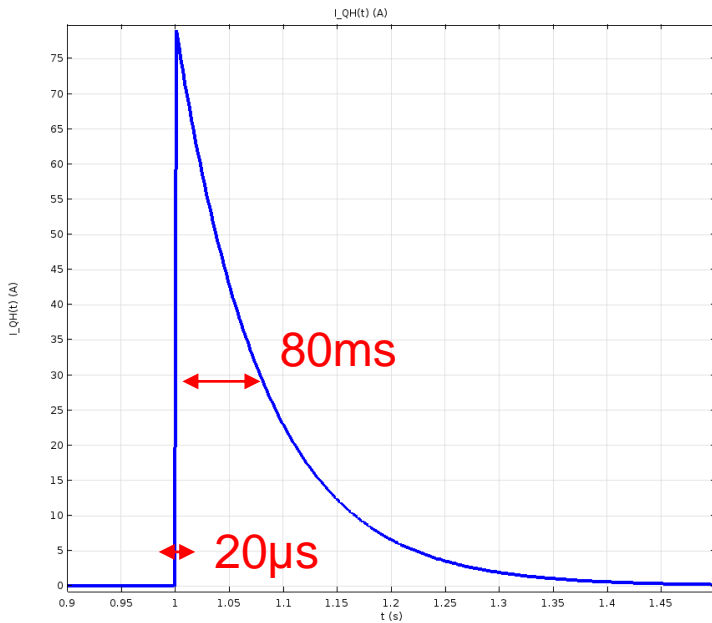
# MD#1182: Measurement of QH vertical kick

Orbit oscillation amplitude at the TCPD as a function of the MB where the QH is fired (simulation)



# MD#1182: Measurement of QH vertical kick

## QH current decay



Baseline connection scheme for the Hi Lumi triplet.

