# MD2901: Asymmetric collimator settings in IR7

## Preliminary results

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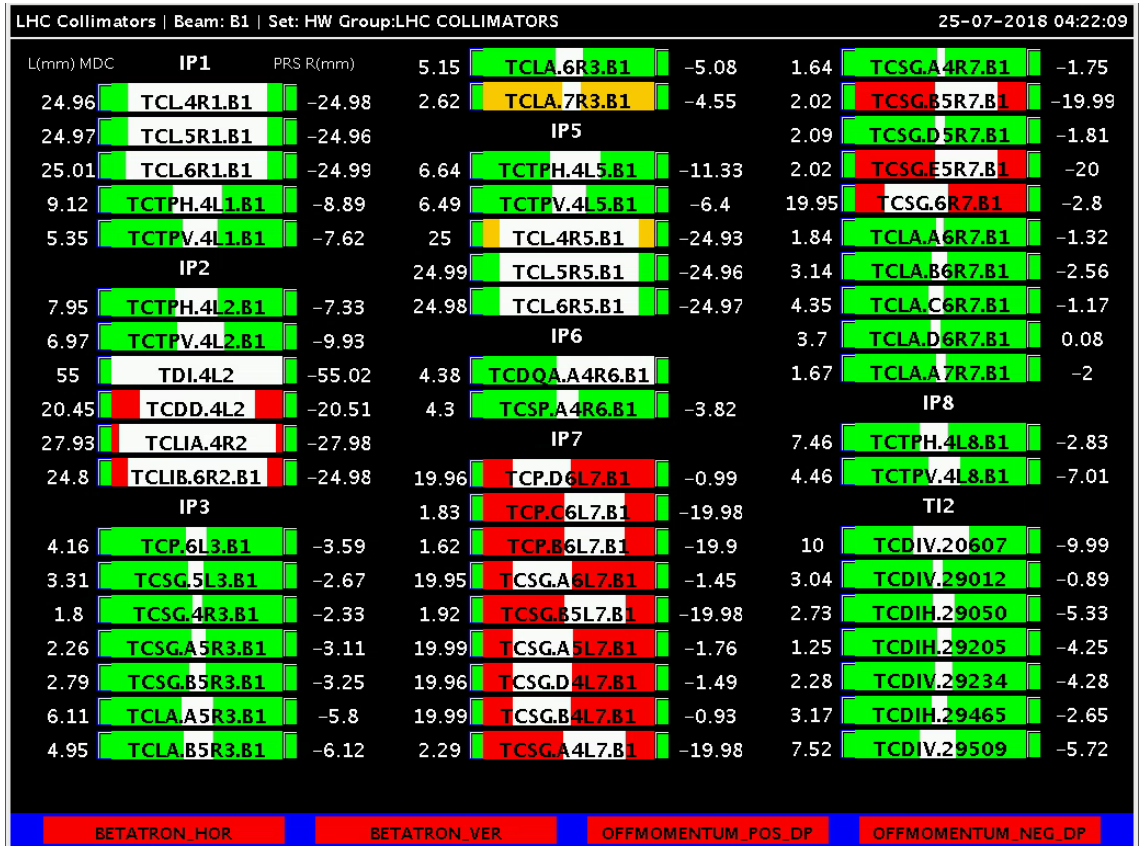
# MD motivation

- Investigate asymmetric settings for IR7 collimators
  - One jaw retracted on several collimators
  - Loss maps performed in first fill
  - Impedance measurement in second fill




# MD procedure

- First fill: 18 pilots for loss maps and 1 nominal of $0.85 \cdot 10^{11} ppb$
- Second fill: 2 nominal $0.75 \cdot 10^{11} ppb$ and $1.75 \cdot 10^{11} ppb$

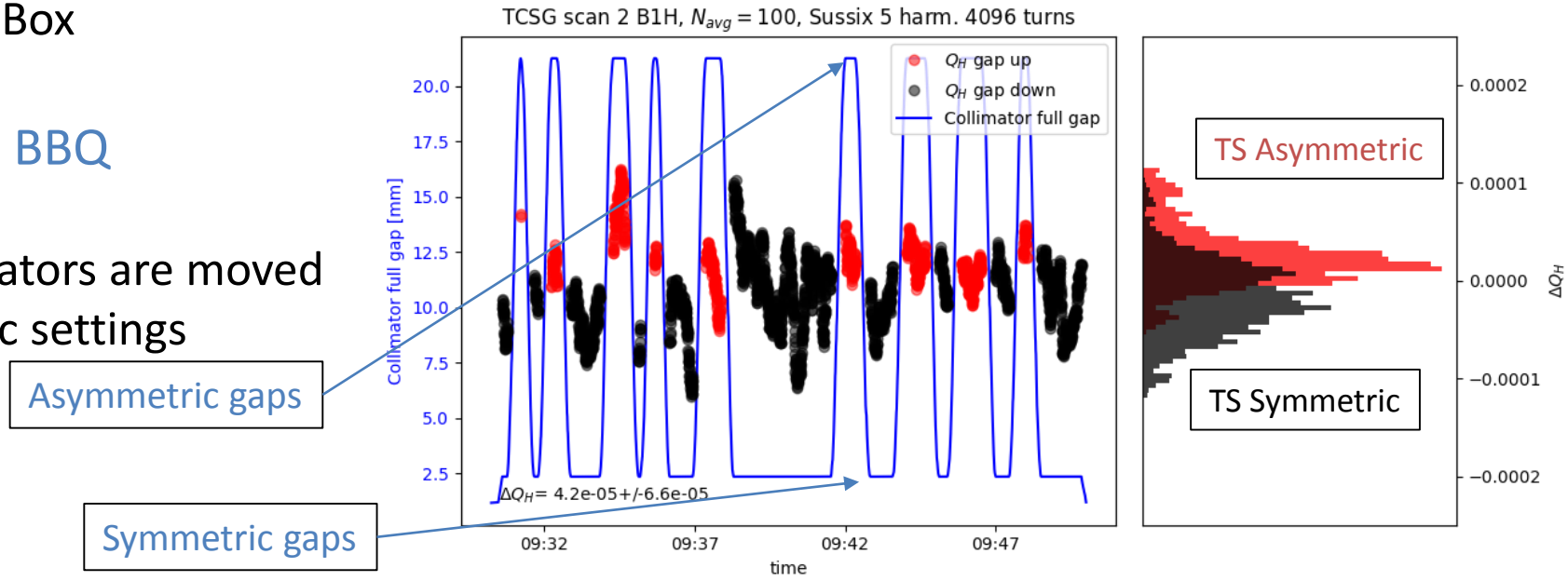
- In second fill: excite all bunches with the ADT to measure their individual tune.
- At the end of each fill, instability growth-rate was measured by switching off the damper

# MD results

- Impedance measurement during second fill
- Tried to apply the method used in previous MDs (TCSPM for example)
  - Coherent kicking of the bunch with the ADT while collimators are moved
  - Bunch-by-bunch, turn-by-turn position data saved with the ADT ObsBox
  - Online computation of tune with pySUSSIX

- Several difficulties encountered
  - Oscillations de-coherence too fast because of high chromaticity & octupole current & ADT gain
  - Erratic recording with the ObsBox

- Fall back on measurement with BBQ
  - Offline analysis
  - Visible tune-shift when collimators are moved from asymmetric to symmetric settings



# MD results

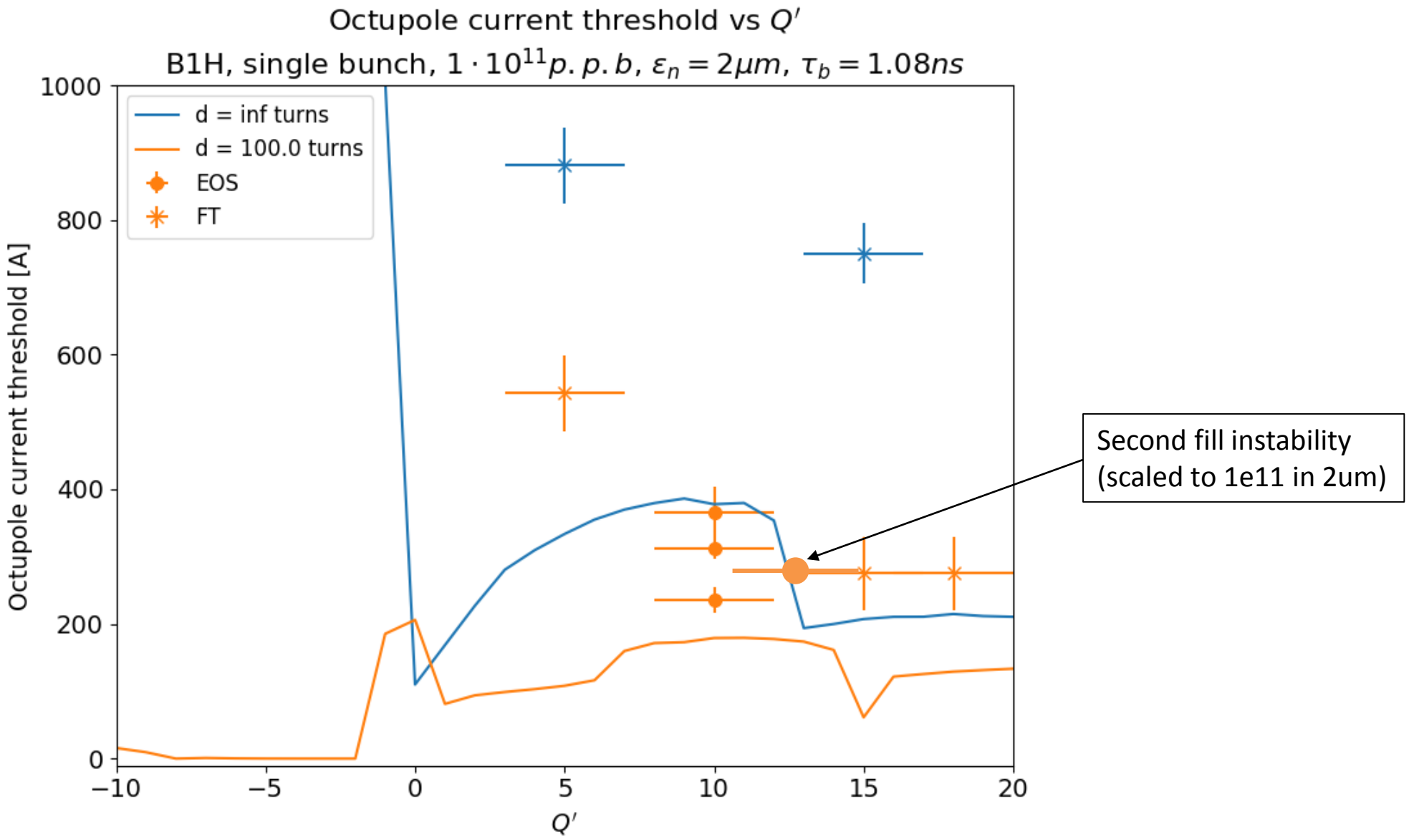
- End of first fill: instability growth-rate measurement
  - Q’ reduced to 5 units, octupoles at 300 A
  - $0.85 \cdot 10^{11} ppb$ (with ~2um emittance) became unstable when switching off ADT

- Second fill: high intensity bunch ($1.75 \cdot 10^{11} ppb$ in 1.8um) was very sensitive!
  - Octupoles were at 550 A
  - Tried to reduce Q’ to 5 units (in two steps of 5 units): B1H and B2H unstable at Q’~10

- Growth rate measurement with asymmetric settings:
  - With the low intensity bunch ($0.85 \cdot 10^{11} ppb$ in 1.5um)
  - Q’ was reduced to 5/8 in B1/B2
  - Bunch unstable at 150A with ADT off

- Linear dependence of the instability growth-rate with intensity1.5um

# MD results


Octupole current threshold vs $Q'$
B1H, single bunch, $1 \cdot 10^{11} p.p.b$, $\varepsilon_n = 2\mu m$, $\tau_b = 1.08 ns$
d = inf turns
d = 100.0 turns
EOS
FT
Octupole current threshold [A]
1000
800
600
400
200
0
−10
−5
0
5
10
15
20
$Q'$
Second fill instability
(scaled to 1e11 in 2um)