Measurements of Q’’ in 2016

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• Dumped before could reach end of squeeze.
• Last modulation was at beta* = 1m
• Clean tune response to modulation for first step at flat top.
B1 – Flat Top

Fill 5309: Beam B1

Graphs showing variations in $dp/p$, $Q_H$, and $Q_V$ over time since fill start [s].
Fill 5309: Beam B2

\[ \frac{dp}{p} \]

\[ Q' = 17.4 \]
\[ Q'' = 1064.3 \]

\[ Q' = 12.7 \]
\[ Q'' = -352.4 \]
Fill 5310

- Went all the way to EOS
- Clean tune response to modulation for first step at flat top.
- Noisy response at EOS. Reasonable measurement for 3/4 planes.
B1 – Flat Top

Fill 5310: Beam B1

Graphs showing oscillations in dp/p, Q_H, and Q_v over time since fill start [s]. The plots also show linear fits with slopes Q' and Q''.

Q' = 14.1  Q'' = -136.8
Q' = 15.2  Q'' = -889.9
B2 – Flat Top

Fill 5310: Beam B2

- dp/p vs Time since fill start [s]
- Q_H vs dp/p
- Q_L vs dp/p
- Q_T vs dp/p

Q' = 14.3
Q'' = -82.7

Q' = 15.4
Q'' = 344.1
B1 – 40cm

Fill 5310: Beam B1

\( Q' = 19.6 \)
\( Q'' = 60701.5 \)

\( Q' = 15.0 \)
\( Q'' = -6367.4 \)
B2 – 40cm

Fill 5310: Beam B2

\[ Q' = 16.3 \quad Q'' = 18179.5 \]

\[ Q' = 15.2 \quad Q'' = 2689.3 \]
Conclusions

• Q” at flat top is small, as expected.
• At EOS:

  \[
  \begin{align*}
  B1H &= \text{Too noisy} \\
  B1V &= -6367 \\
  B2H &= 18,000 \\
  B2V &= 2700
  \end{align*}
  \]

• With some post processing, could be possible to extract something for B1H.
• Some discrepancy over the sign of vertical Q”, could be due to small value?
• Taking the measurements of the octupole contribution to Q” from 2015, we can state that the Q” with loct=375 at EOS is:

  \[
  \begin{align*}
  B1H &= 18,000 + \text{NoisySignal} = (\text{Estimation} \approx 30,000) \\
  B1V &= -8700 - 6367 = -15067 \\
  B2H &= 18,000 + 18,000 = 36,000 \\
  B2V &= -8000 + 2700 = -5300
  \end{align*}
  \]