Initial Results from October Machine Studies on Sextupoles

-- Improved digital tune tracker measurements

-- Improved beam size measurement with more centered beam

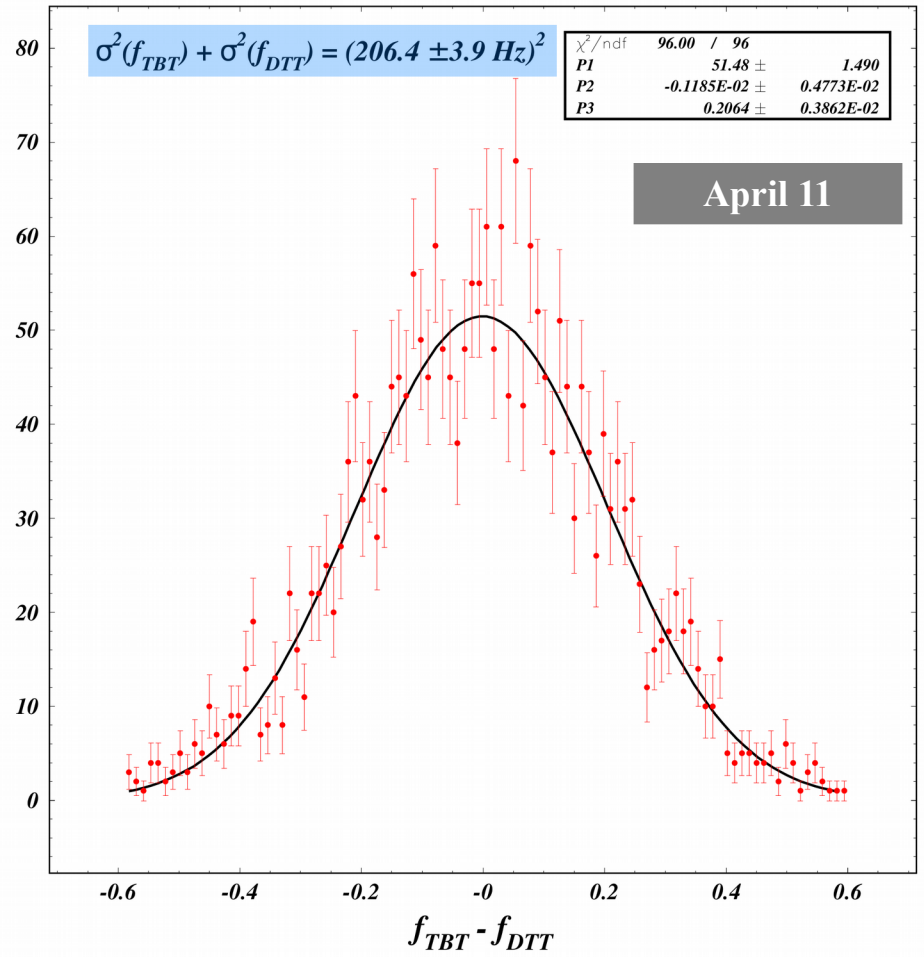
Jim Crittenden

Bazarov/Rubin group meeting

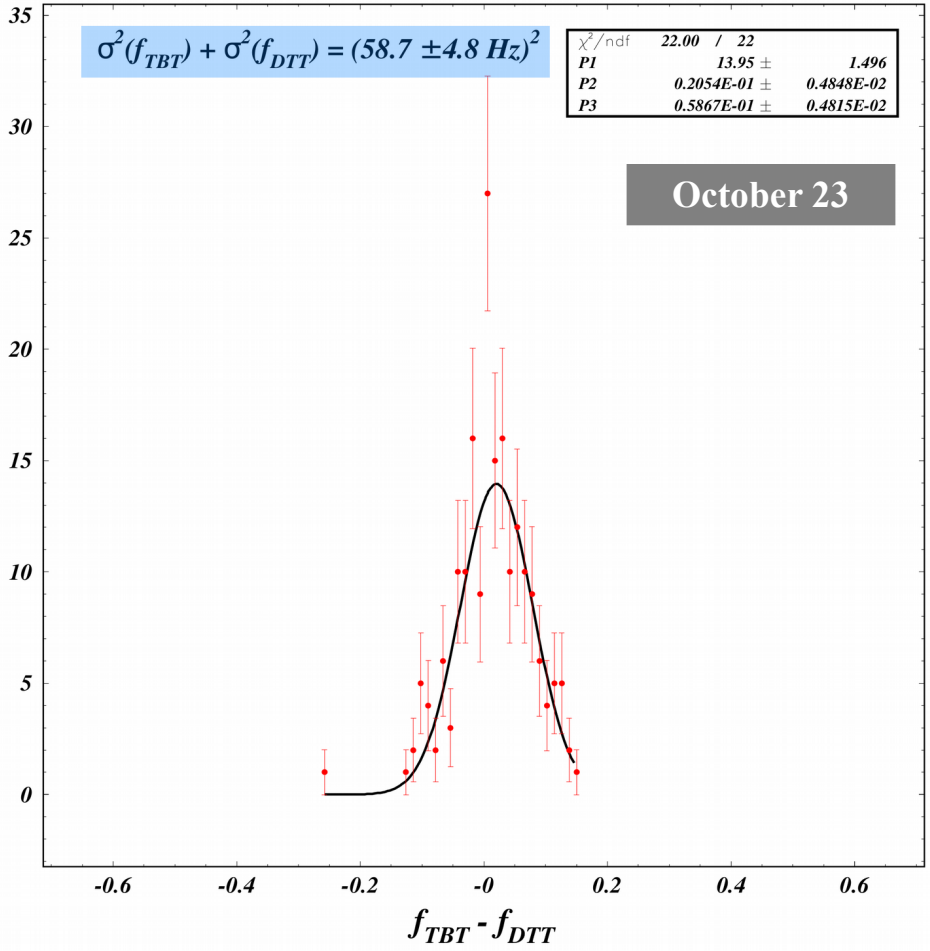
3 November 2021

Significant improvement in tune measurement accuracy, especially vertical

Sunday 11 April 2021 (V plane): Evaluate DTT and TBT tunes RMS



23 October (-23.7 dB) 2021(V plane): Evaluate DTT and TBT tun



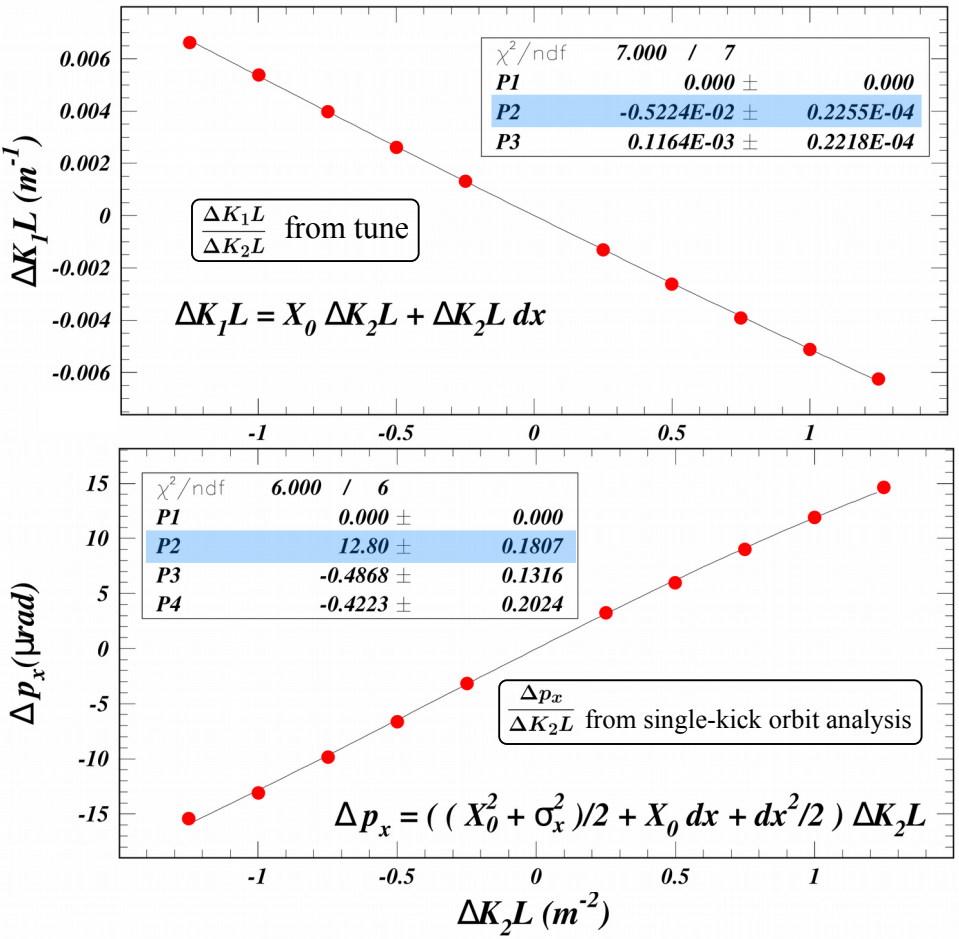
Shaking amplitude increased from 170 (-35.4 dB) to 653 (-23.7 dB).
Averaging parameter increased from 0 (1 sample) to 5 (32 samples).

Beam size calculation with smaller beam offset

$$\sigma_x^2 = 2\,\frac{\Delta p_x}{\Delta K_2 L} - \left(\frac{\Delta K_1 L}{\Delta K_2 L}\right)^2$$

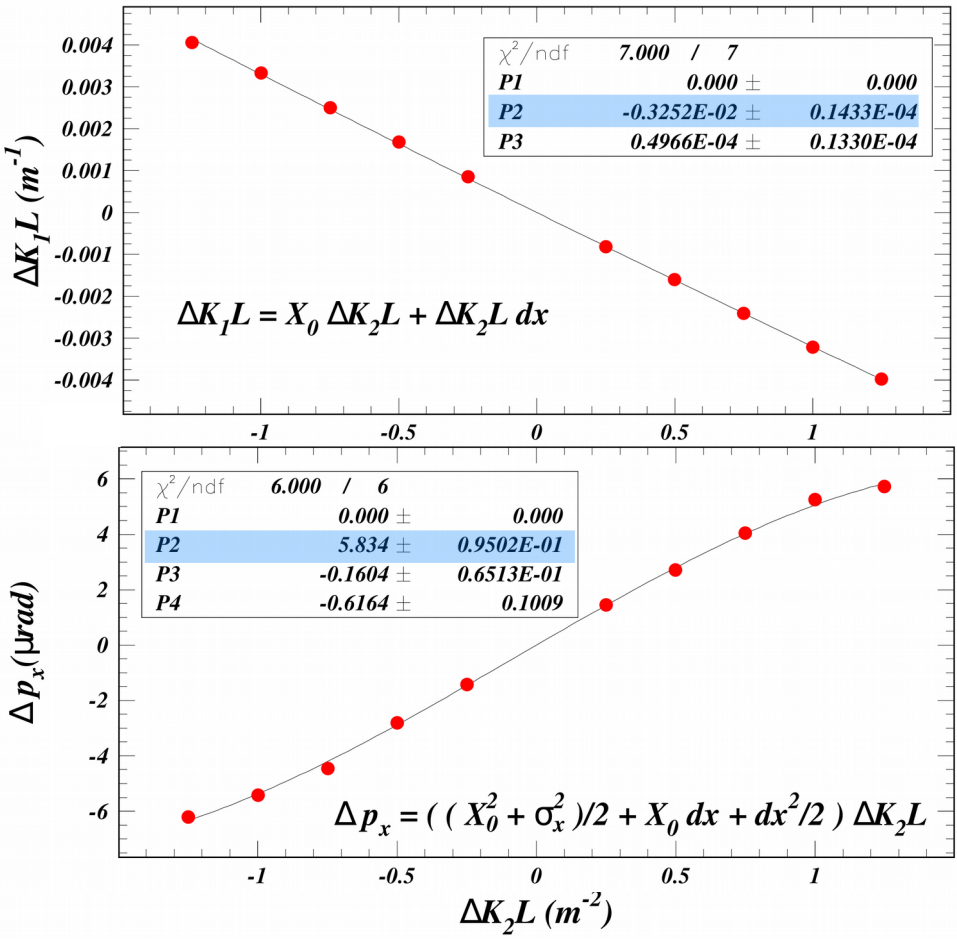
Sextupole 10AW
Model: σ_x = 1.13 mm

Feb 21: X_0 = -5.224± 0.023 mm



σ_x^2 = -1.70 ± 0.43 mm^2 < 0

Oct 23: X_0 = -3.252 ± 0.014 mm



σ_x = 1.05 ± 0.10 mm