FONT Meeting

Friday 3rd May 2019

Update on dual-phase feedback paper

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Effect of feedback on location of beam waist

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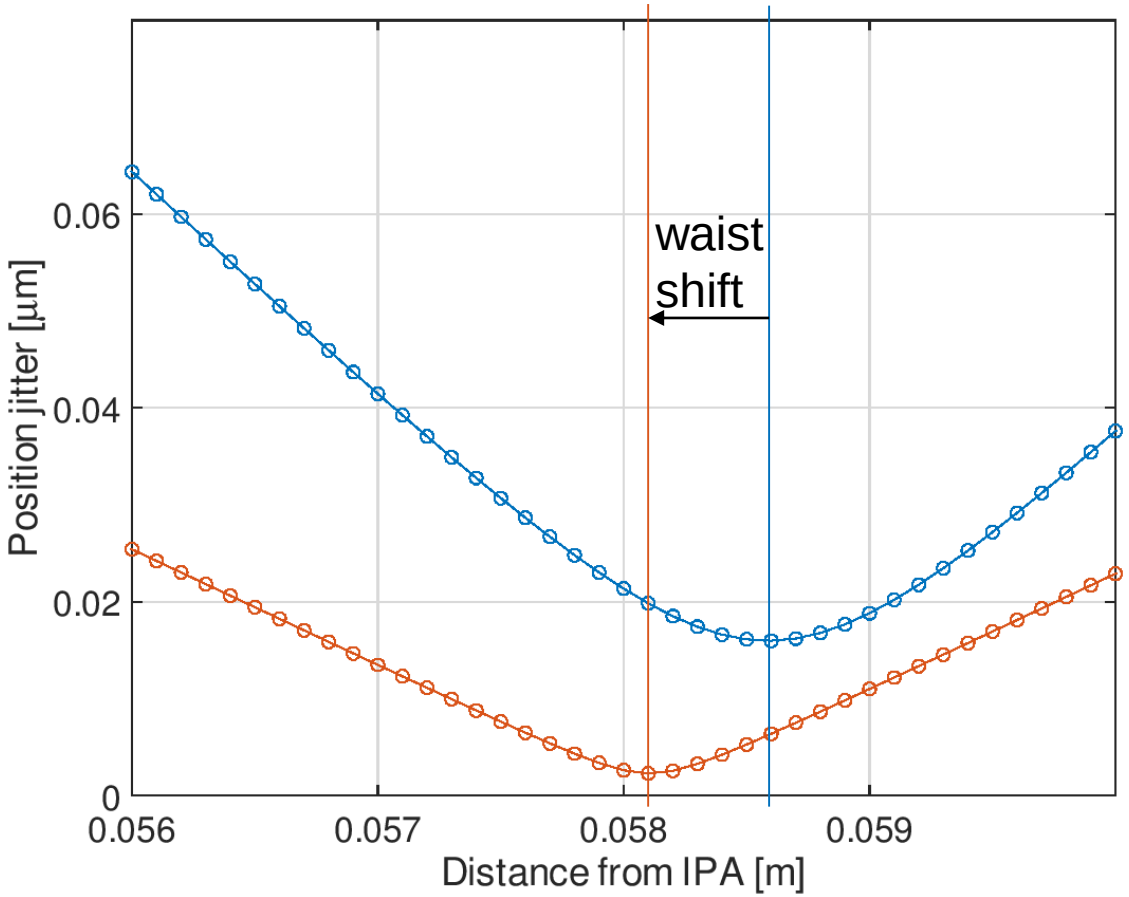
Update on paper

- Switched to REVTeX template used by APS journals
- Incorporated suggested changes:
  - Layout of figures (histograms)
  - Content of tables

Update on paper

- What's wrong with the data?
  - Not the best feedback performance (IPAC19 paper)
  - Not the best survival of the correction (IPAC17 paper)
  - Imperfect agreement between data and model (correlations)
  - Correction factor differs from IPA to IPB despite ballistic beam
  - No reduction in jitter at waist interpolated from IPA/IPB data

Jitter at IP

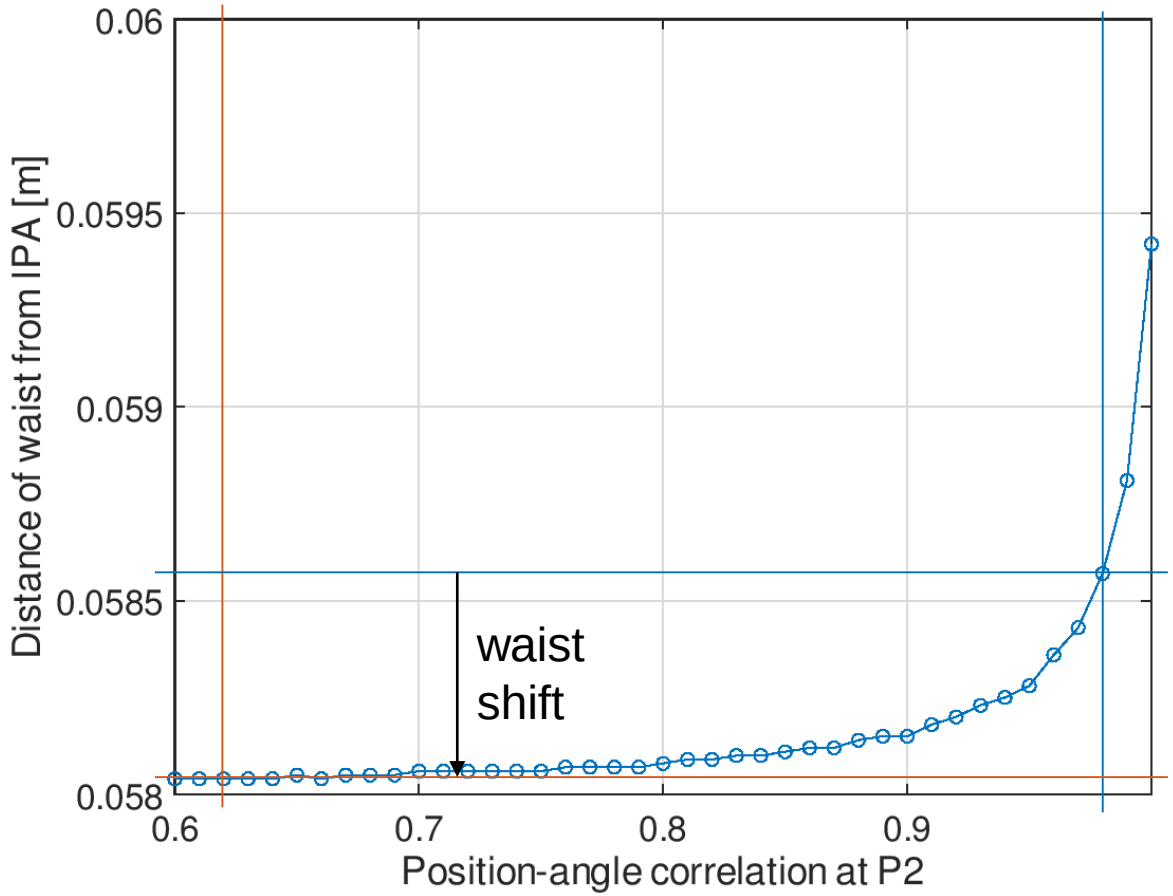


- Angle at P2 inferred from measurements of bunch 2 at P2 and P3 and MAD8 transfer matrix
- Resulting position-angle distribution at P2 tracked to IP for both jitRun2 (off), fbRun14 (on)
- Results suggest the feedback has shifted the waist from 0.0586 m downstream of IPA to 0.0581 m: closer to IPA by 0.50 mm

Calculated P2 position-angle correlation coefficient

	jitRun2	fbRun14
Bunch 1	0.979	0.977
Bunch 2	0.981	0.621

Location of waist



- Draw two random vectors from a given multivariate Gaussian distribution
  i.e. generate a pair of vectors with a specified correlation coefficient to represent the position and angle at P2
- Propagate this simulated data to the IP region using the MAD8 transfer matrix
- Location of waist is seen to change as a function of position-angle correlation at P2
- Measured effect of feedback is to reduce position-angle correlation at P2 from ~0.98 down to ~0.62 [previous slide]
- Model predicts this should shift waist from 0.05857 m downstream of IPA to 0.05804 m: 0.53 mm closer to IPA

Conclusion

- Effect of feedback on waist location should be considered in paper – particularly if results from Shintake are included