

# Lattice plans for 100 GeV Au run

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- IBS suppression lattice
- Crossing  $\gamma_T$
- $0.5m\beta^*$  for Phenix and Star
- The  $\beta^*$  squeeze

# IBS suppression lattice

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- Large arc phase advance
  - For dAu82,  $\phi_x \approx 93^\circ$  in the yellow ring
  - Run-10:  $\phi_x \approx 93^\circ$  in both rings
- Lower dispersion in arcs
  - Lower IBS growth (V. Litvinenko)
- Reverse the Q7 shunt power supply for both rings

# Crossing $\gamma_T$

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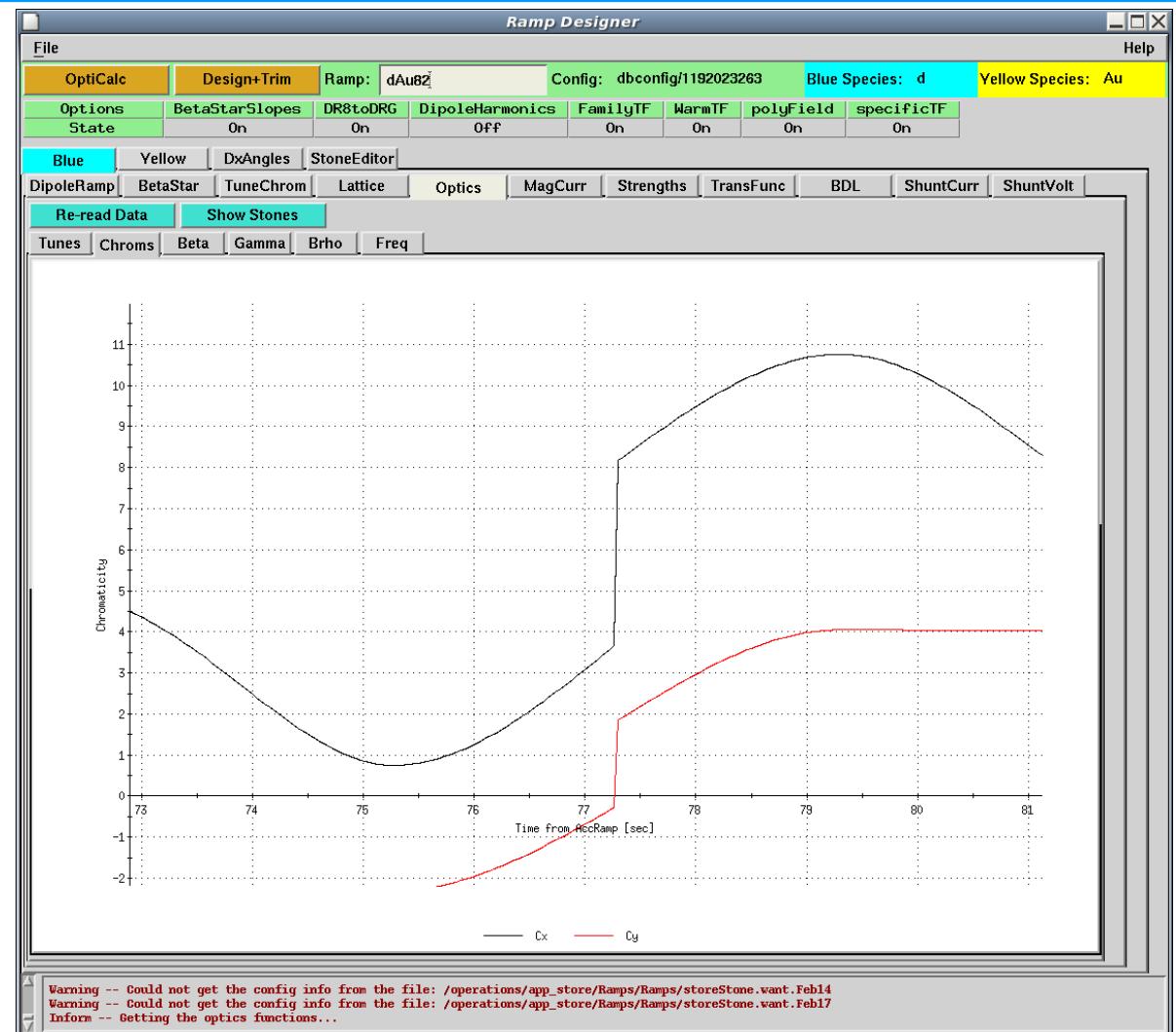
- $\gamma_T$  follows the horizontal tune:  $Q_x$
- Identical tunes ( $Q_x$ ) in both rings gives same  $\gamma_T$ 
  - Use different tunes in each ring
  - Use the  $\gamma_T$  jump quadrupoles to shift the  $\gamma_T$  (C. Montag)
- Chromaticity swing during  $\gamma_T$  jump must be positive

# Crossing $\gamma_T$

Standard optics from  
dAu82 Blue ring

$$Q_x = 28.23$$

$$Q_y = 29.22$$



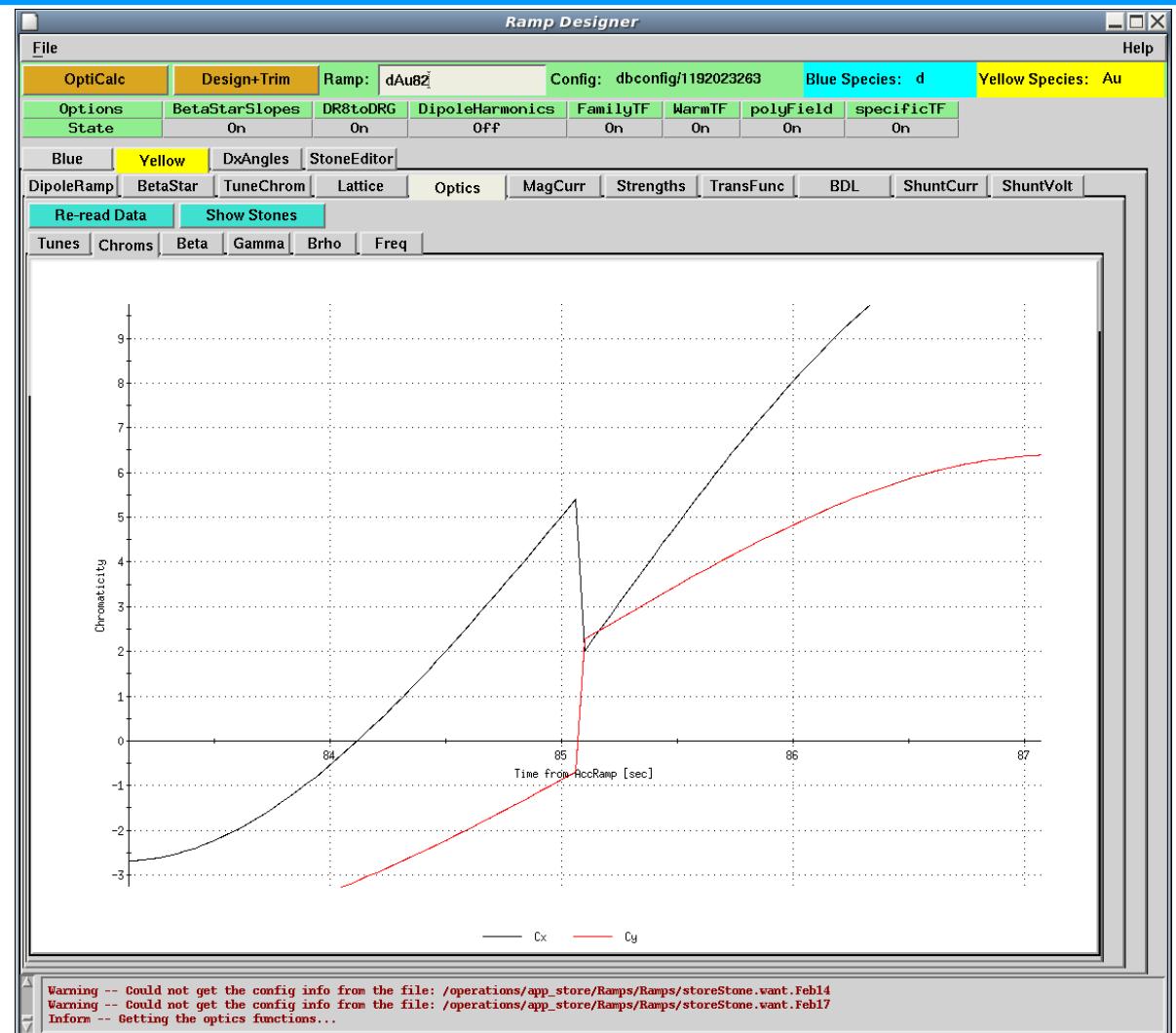
# Crossing $\gamma_T$

IBS-suppression optics  
from dAu82 Yellow ring

$$Q_x = 31.23$$

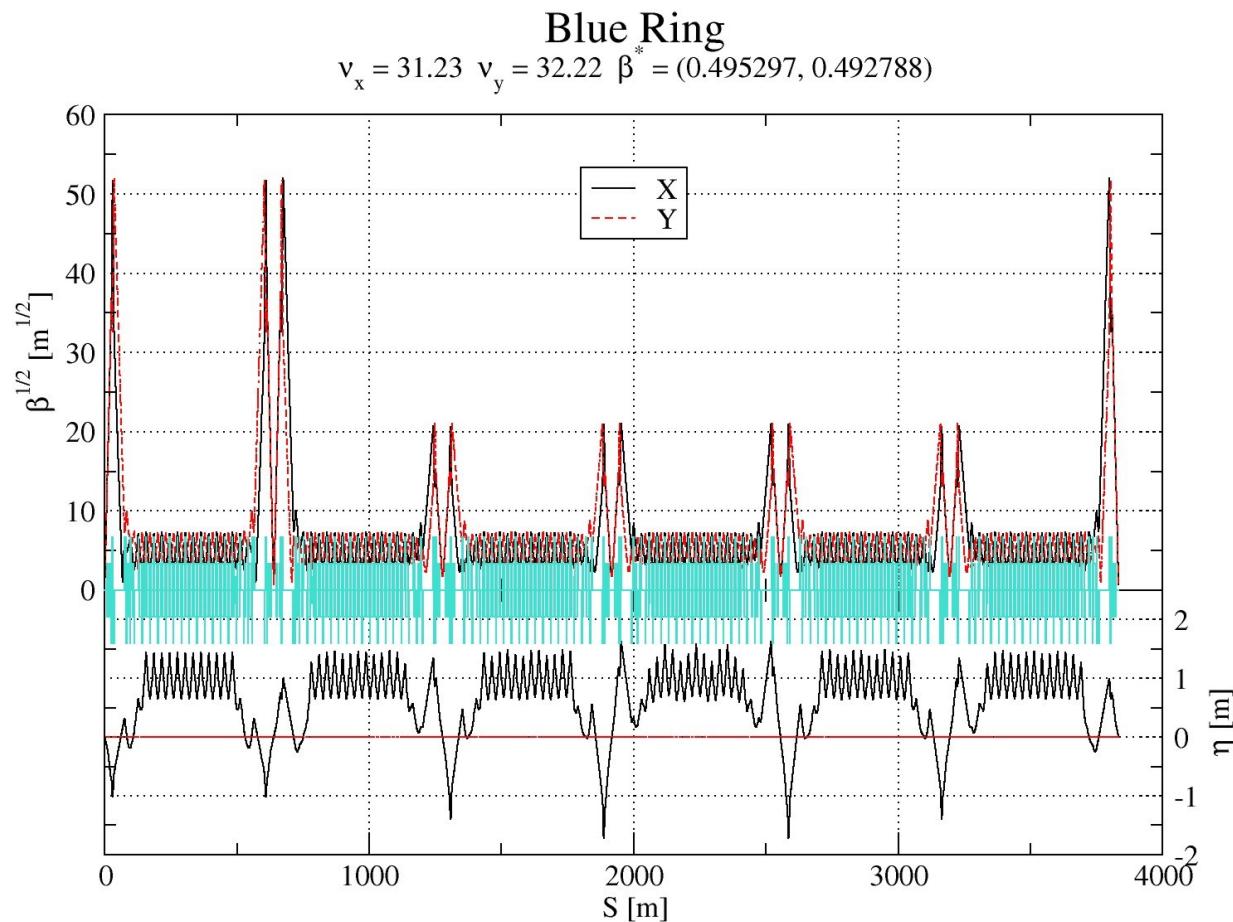
$$Q_y = 32.22$$

Is this Real or Model  
issue?



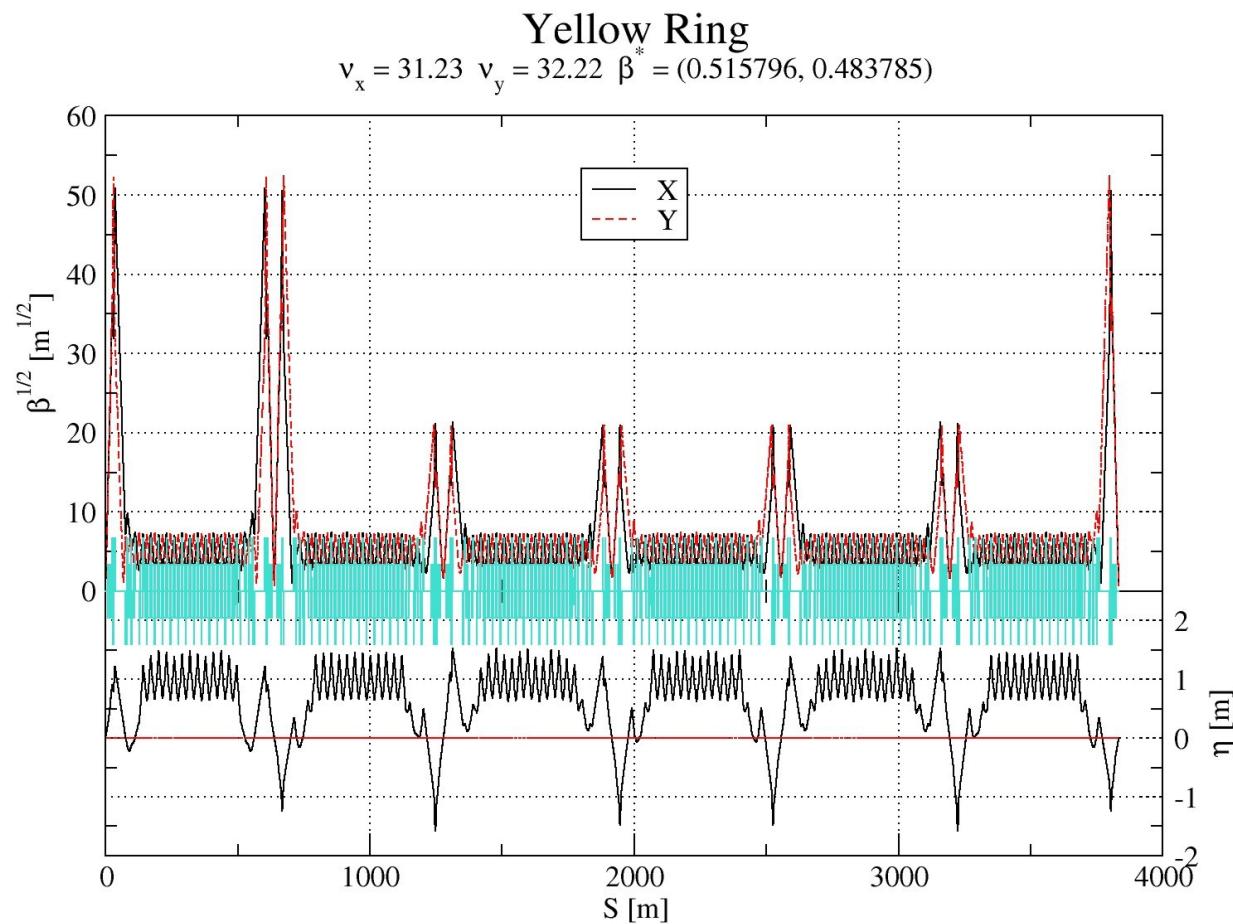
# $0.5m \beta^*$ for Phenix and Star

Preliminary  
Solution

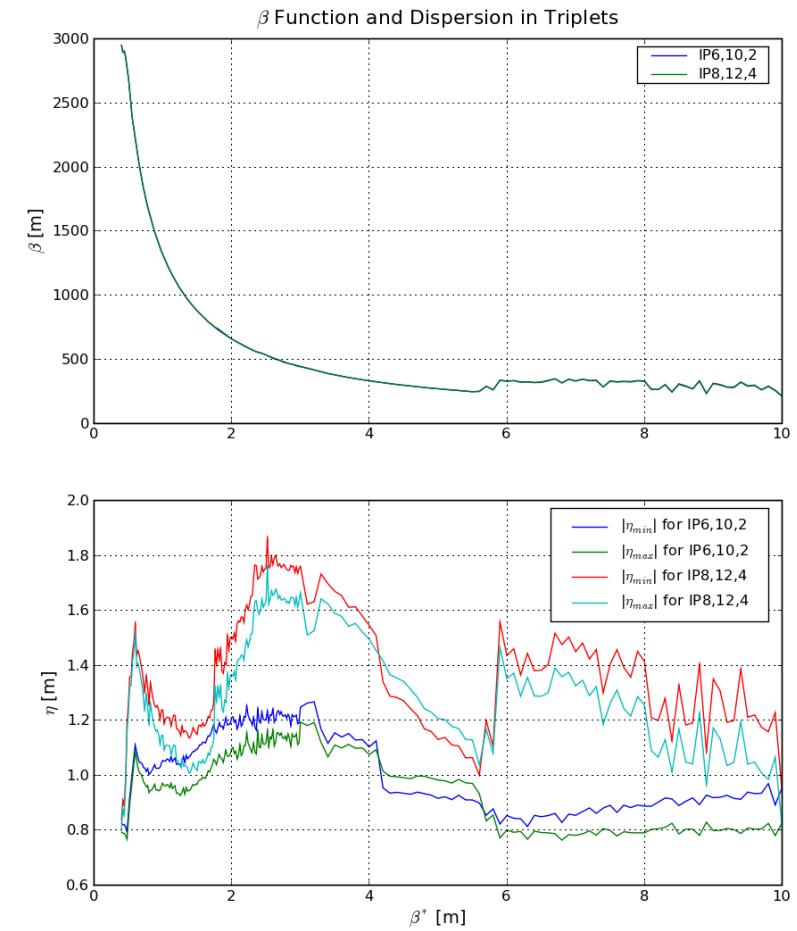
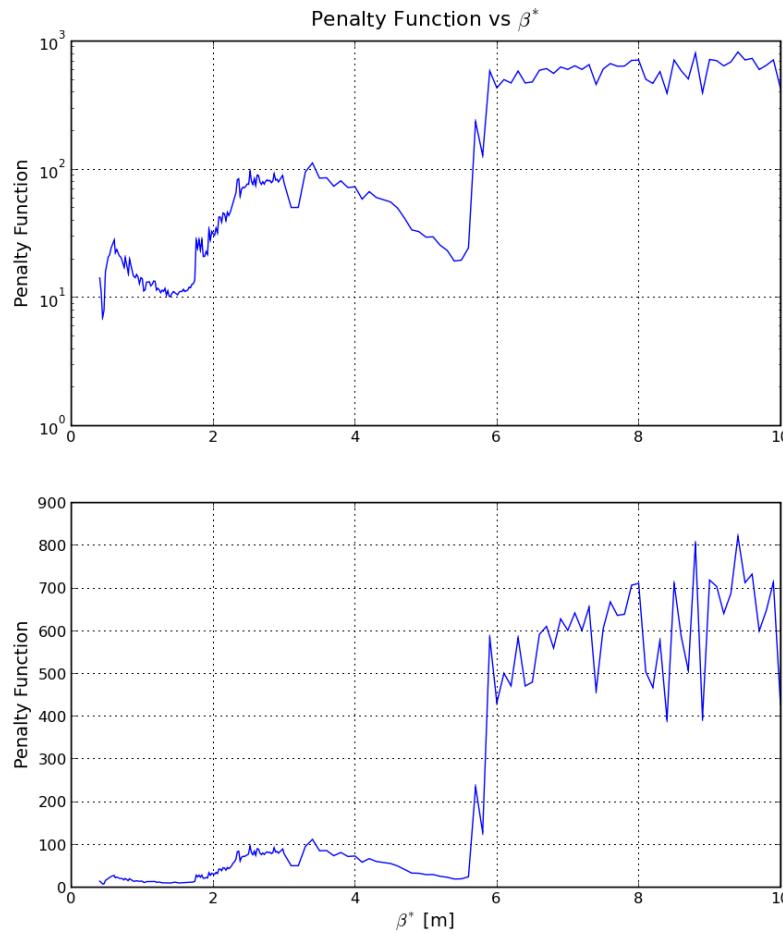


# $0.5m \beta^*$ for Phenix and Star

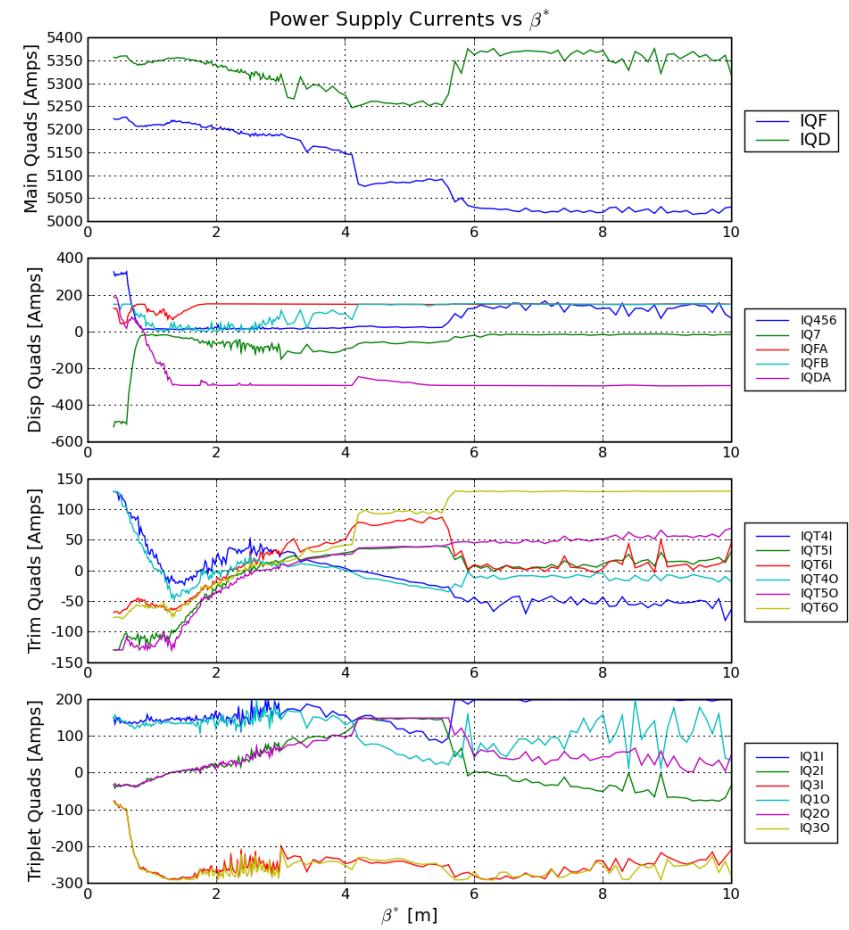
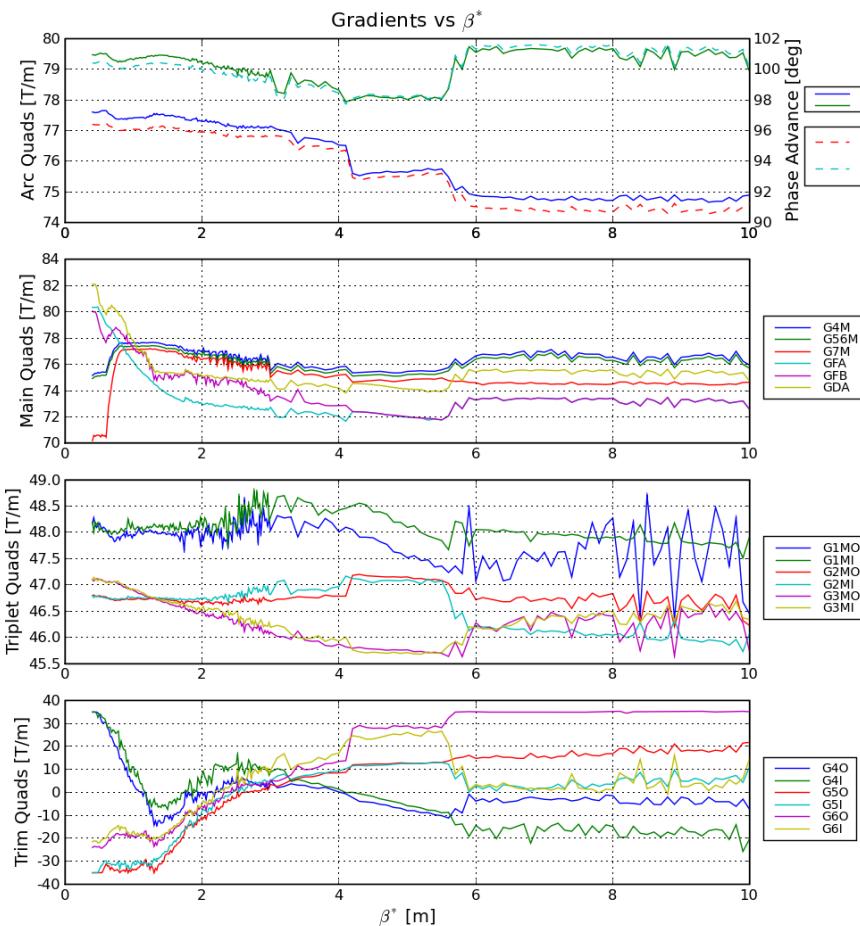
Preliminary  
Solution



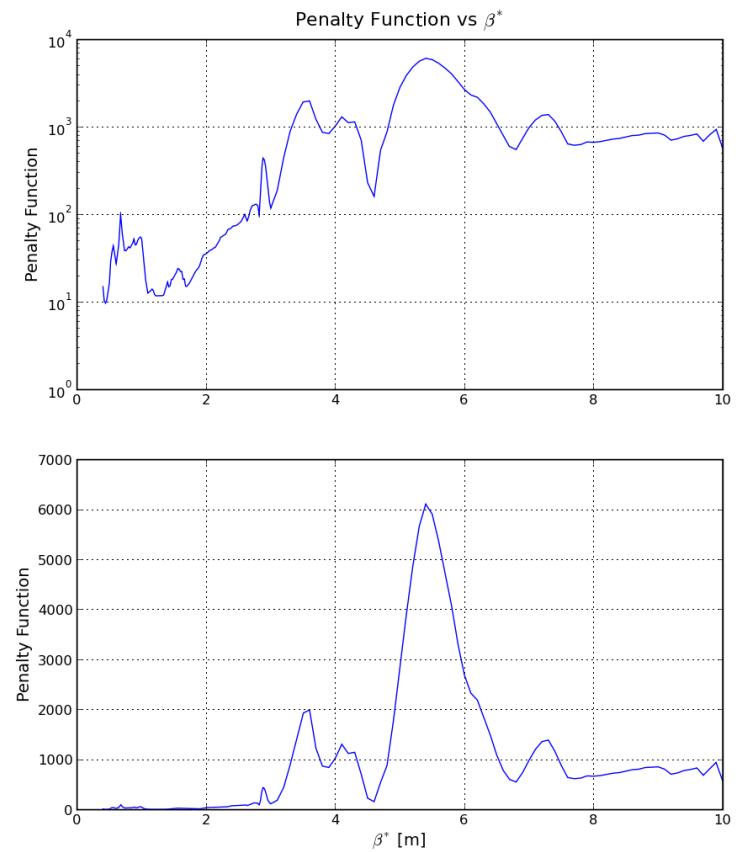
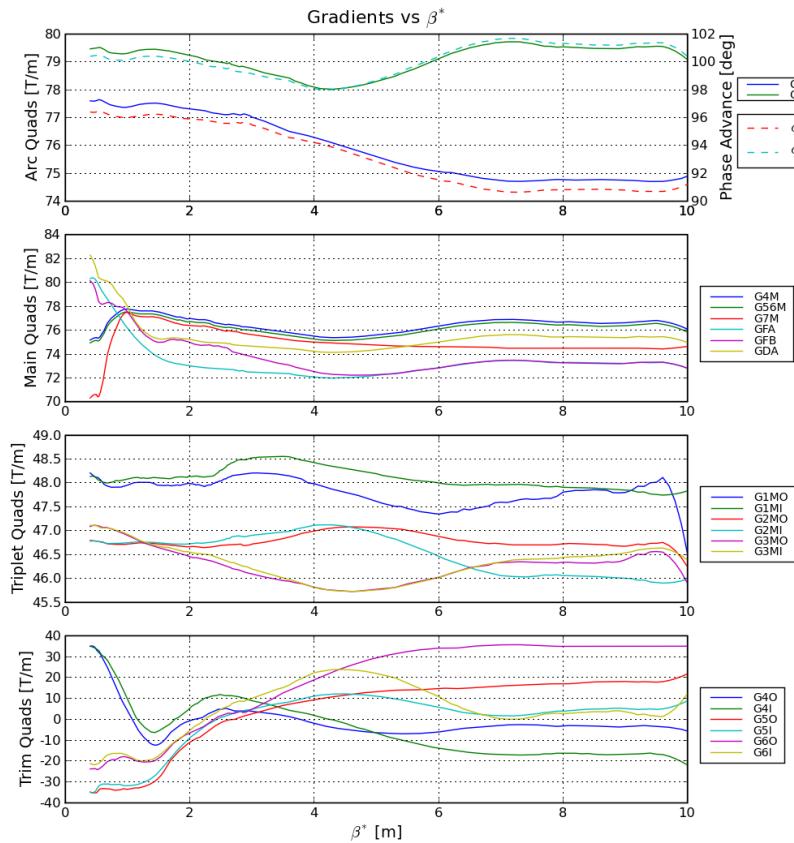
# The $\beta^*$ Squeeze



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Smoothing the squeeze: This suggests smoothing should be weighted by penalty function.

# The $\beta^*$ Squeeze

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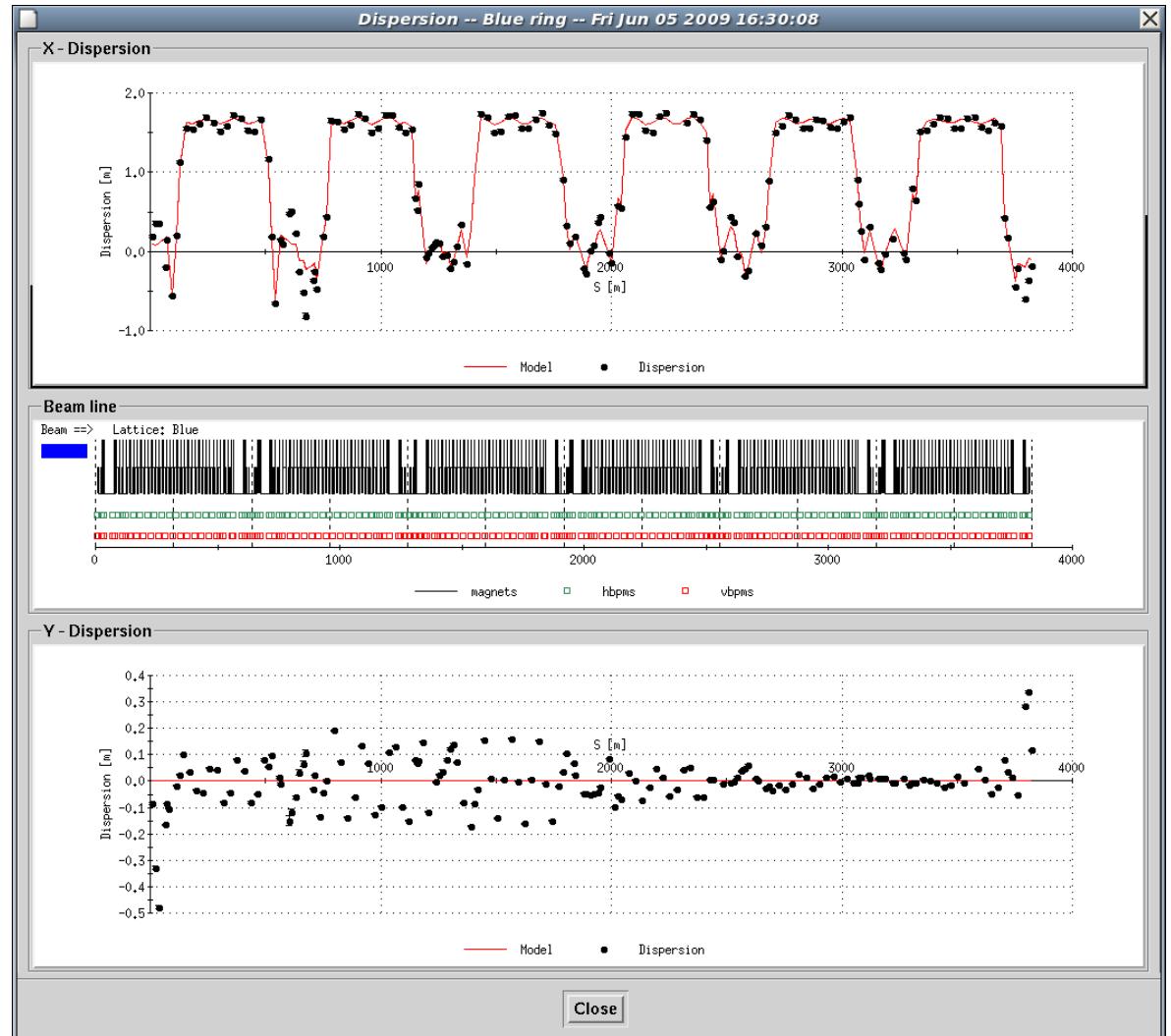
- Need the shunt supply limits for the next run
- Improve the conversion: strength  $\Leftrightarrow$  currents
  - Common conversion for optimization/operation
  - Understand the code dbfits.tcl (J. van Zeijts)
  - Goal toward updating the FieldFits file
    - Measured optics closer to design optics
  - Less/smaller tweaks to fit within the limits

# The $\beta^*$ Squeeze

Dispersion discrepancy at Phenix and Star between measurements and model.

Possibly due to current  $\leftrightarrow$  strength conversions?

May get worse at smaller  $\beta^*$ .



# Summary

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- The IBS-suppression lattice is operational
- Separating  $\gamma_T$  between rings requires development
  - Chromaticity swing through  $\gamma_T$  needs further study
- Low  $\beta^* = 0.5m$  is achievable

# Summary, cont...

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- $\beta^*$  squeeze improvements
  - Reversal of the Q7 shunt supply required for IBS-suppression optics
  - Need the shunt supply current limits for fitting
  - Improve current  $\Leftrightarrow$  strength conversions
    - Common conversions optimization/operational
  - Improve the smoothing process for optimization