Progress in IR8 matching for $\beta*$ squeeze

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IR8 squeeze history

- Since V6.5, IR8 phase advance at injection changed to accommodate phase advance difference in IR3 and IR7 (O. Bruning, LTC 31/03/04)
  - From (μ_x, μ_y)=(**3.204,2.804**) to (**3.183,2.974**) for beam1 and (**3.059,2.782**) for beam2
- Strength files for optics with $\beta*$ between 10 and 1m computed by A.Lombardi and T.Risselada
  - Not a smooth transition in quad strengths
- Using V6.500 optics, R. deMaria achieved un-squeezed optics for beam 2 and squeezed for beam1 up to $\beta*$=3.4m (LOC, 06/12/05)
  - Not the correct phase advance between MKI and TDI, TCLI
  - Large β−function near Q6
  - Strength of MQX not optimised (>205T/m)


Twiss plot: beta*=3.589423646 m
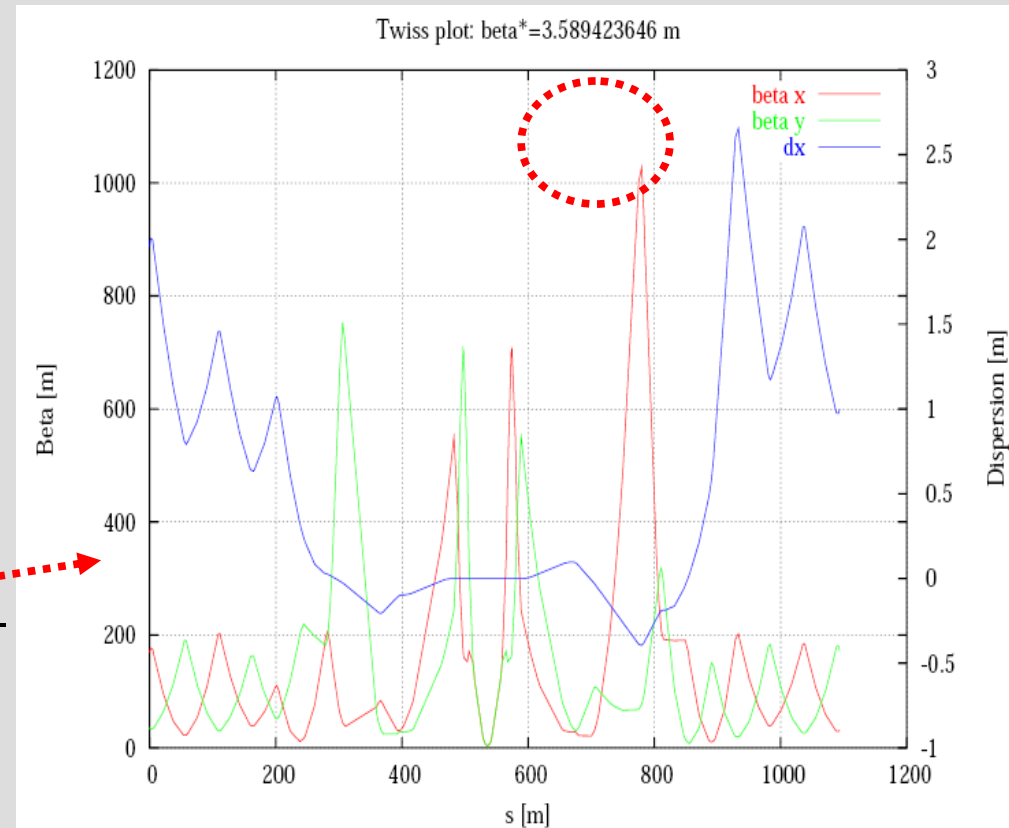
IR8 squeeze strategy

- Using optics V6.500 (unequal phase advances for beam1 and beam2)
- Use R. de Maria's "Jacobian" matching algorithm
- First find a β^*=10m optics with the correct total phase advance and setting MQX values to 205 T/m
- From this point start a squeeze until algorithm fails
- Constraint always β near Q6 to values below 350-400m (as at injection)
- Check the aperture and reiterate if needed, adding more constraints
- Compute the crossing scheme and bumps ("nominal" with horizontal crossing angle and "fancy" with crossing in both planes) and check again the aperture
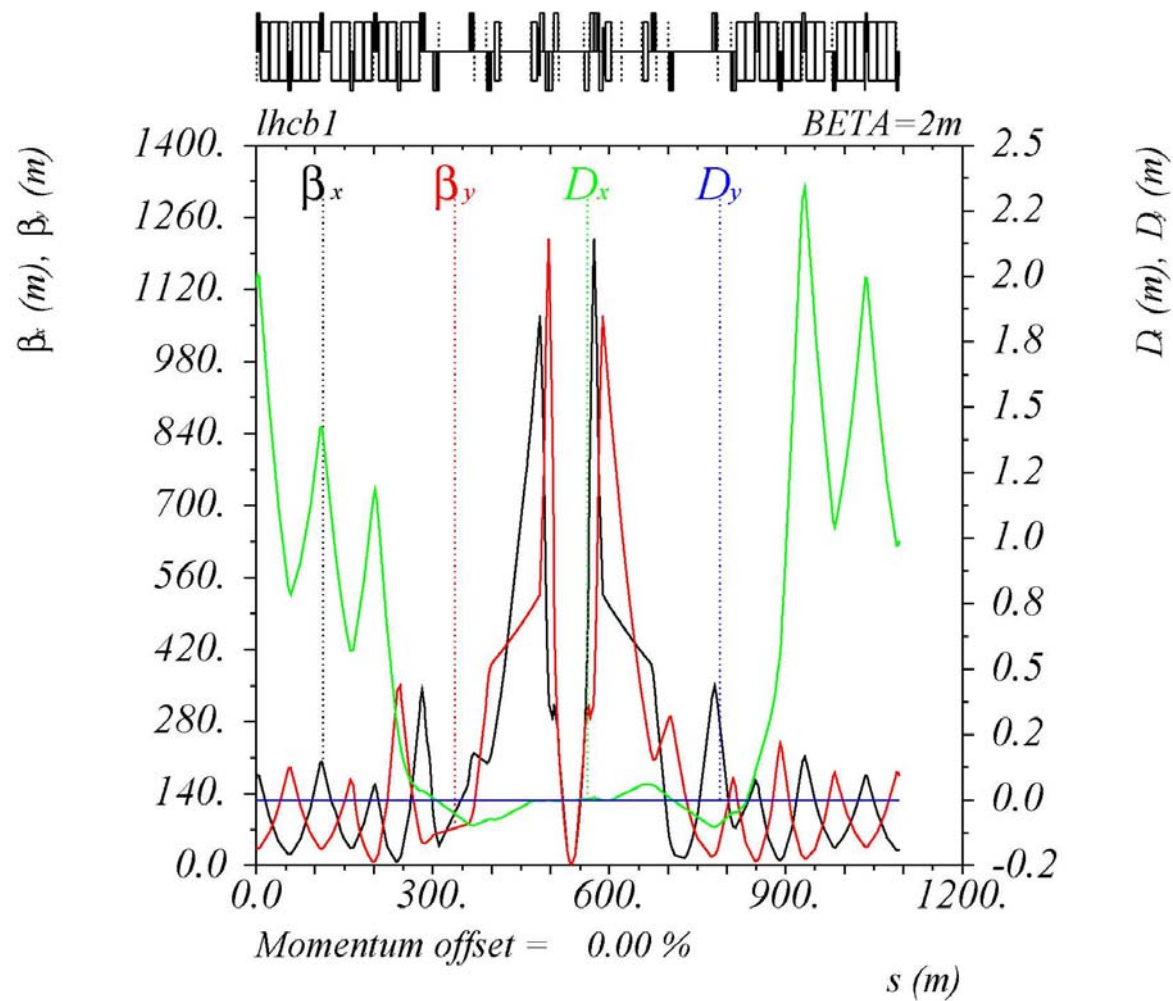- Proceed for beam1 and for beam2, independently

Squeeze beam1

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Squeeze beam1

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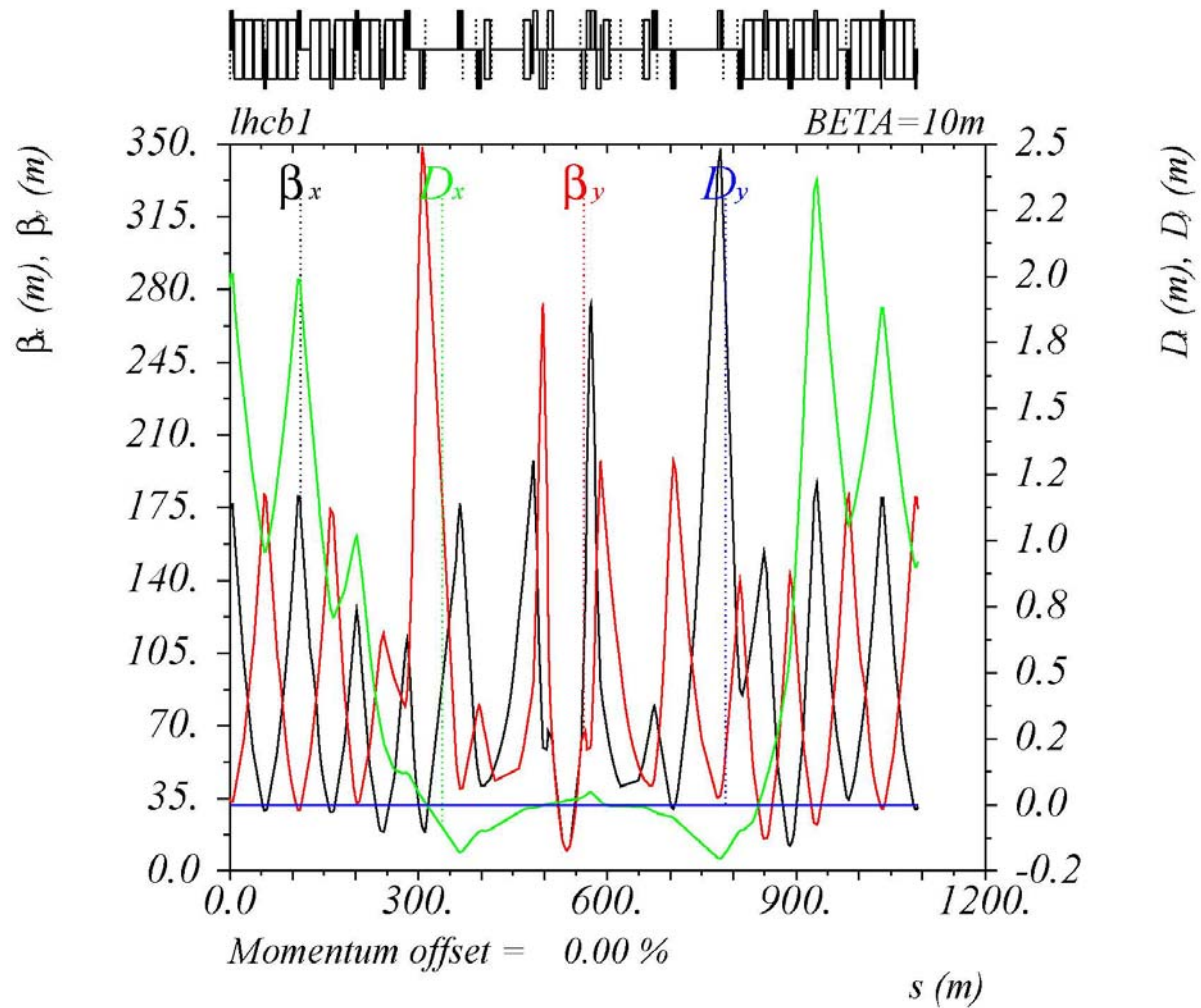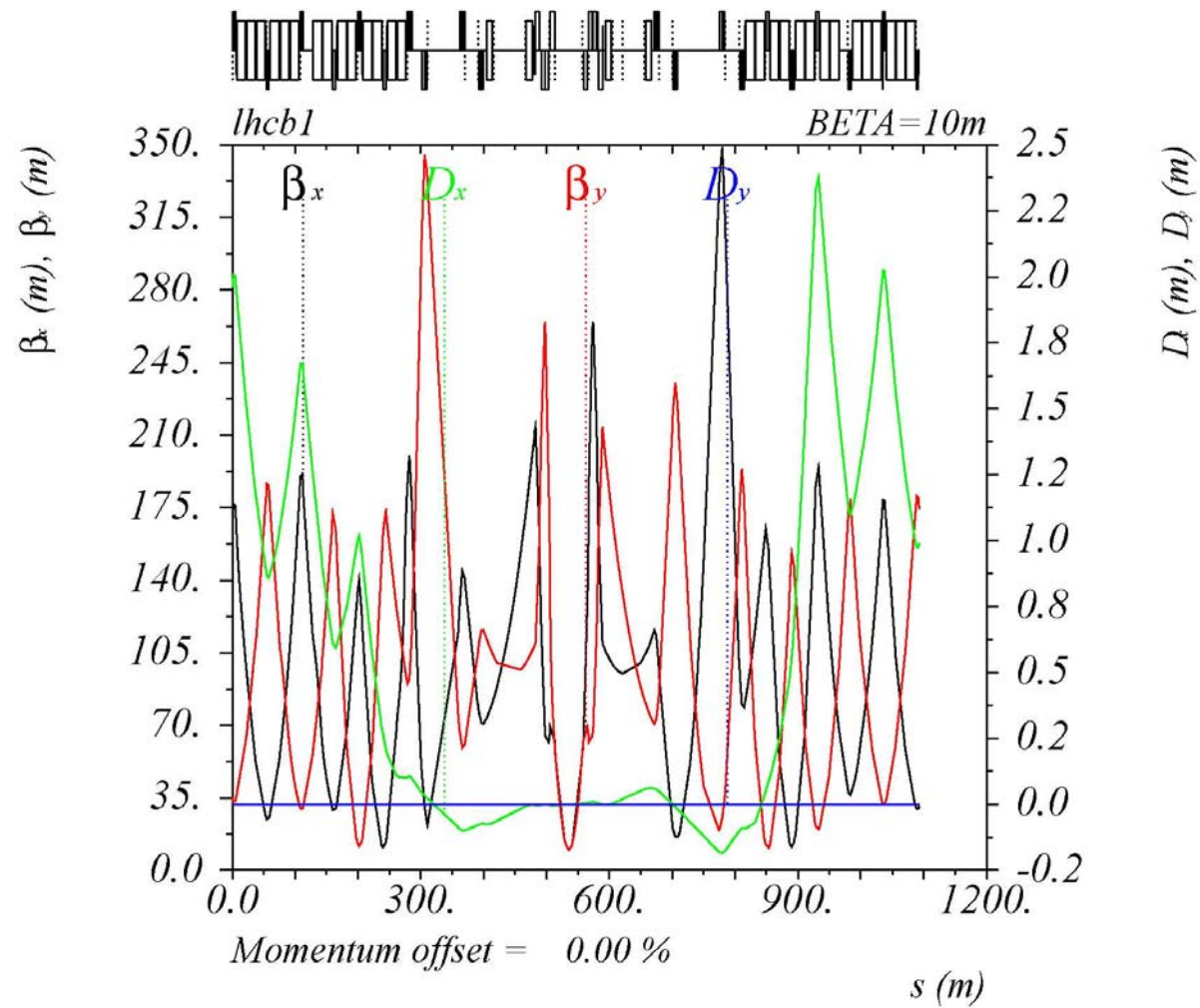
Squeeze beam1

Quad strengths

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