Intermediate steps for β squeeze

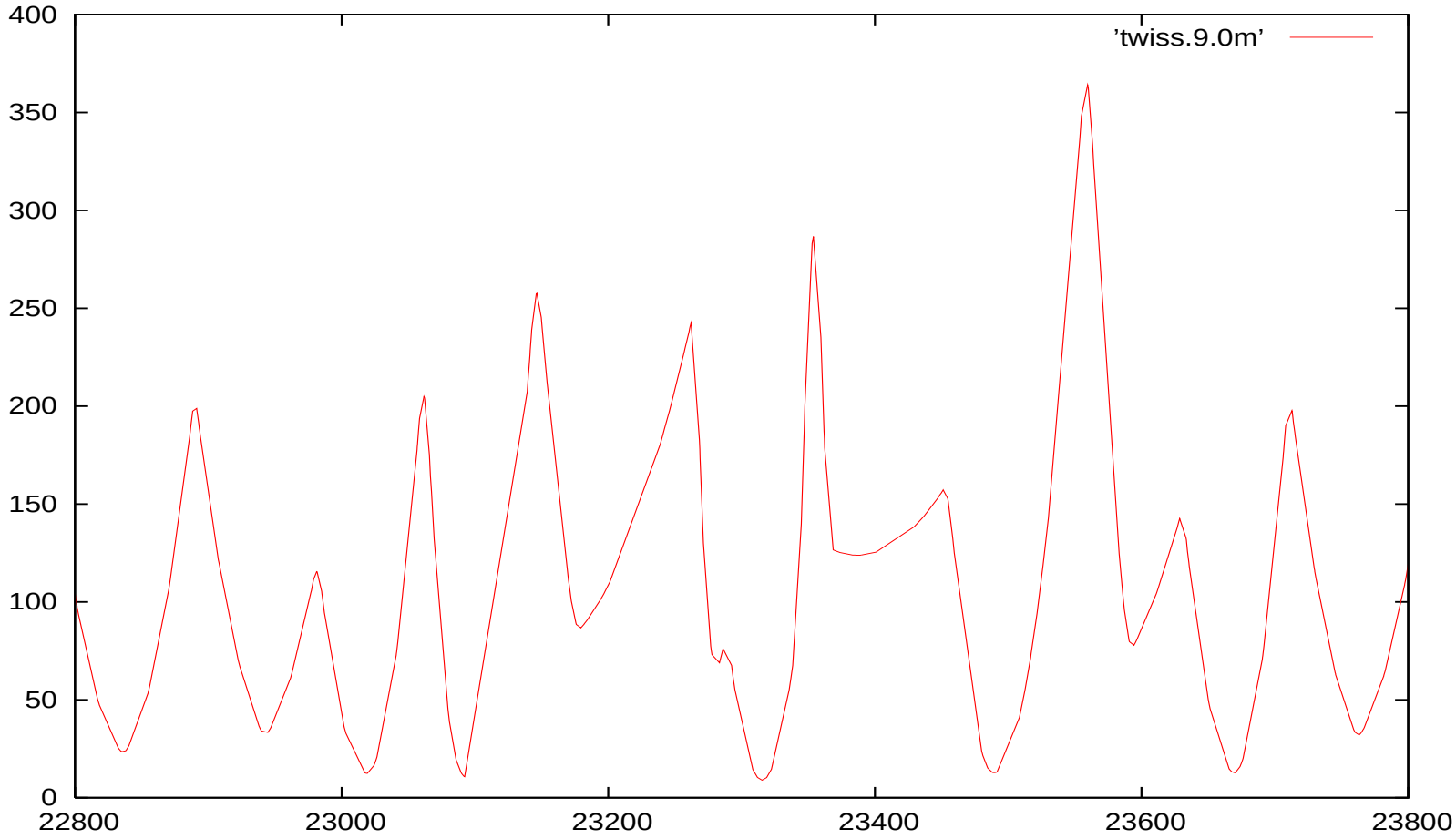
in IP 8

W. Herr

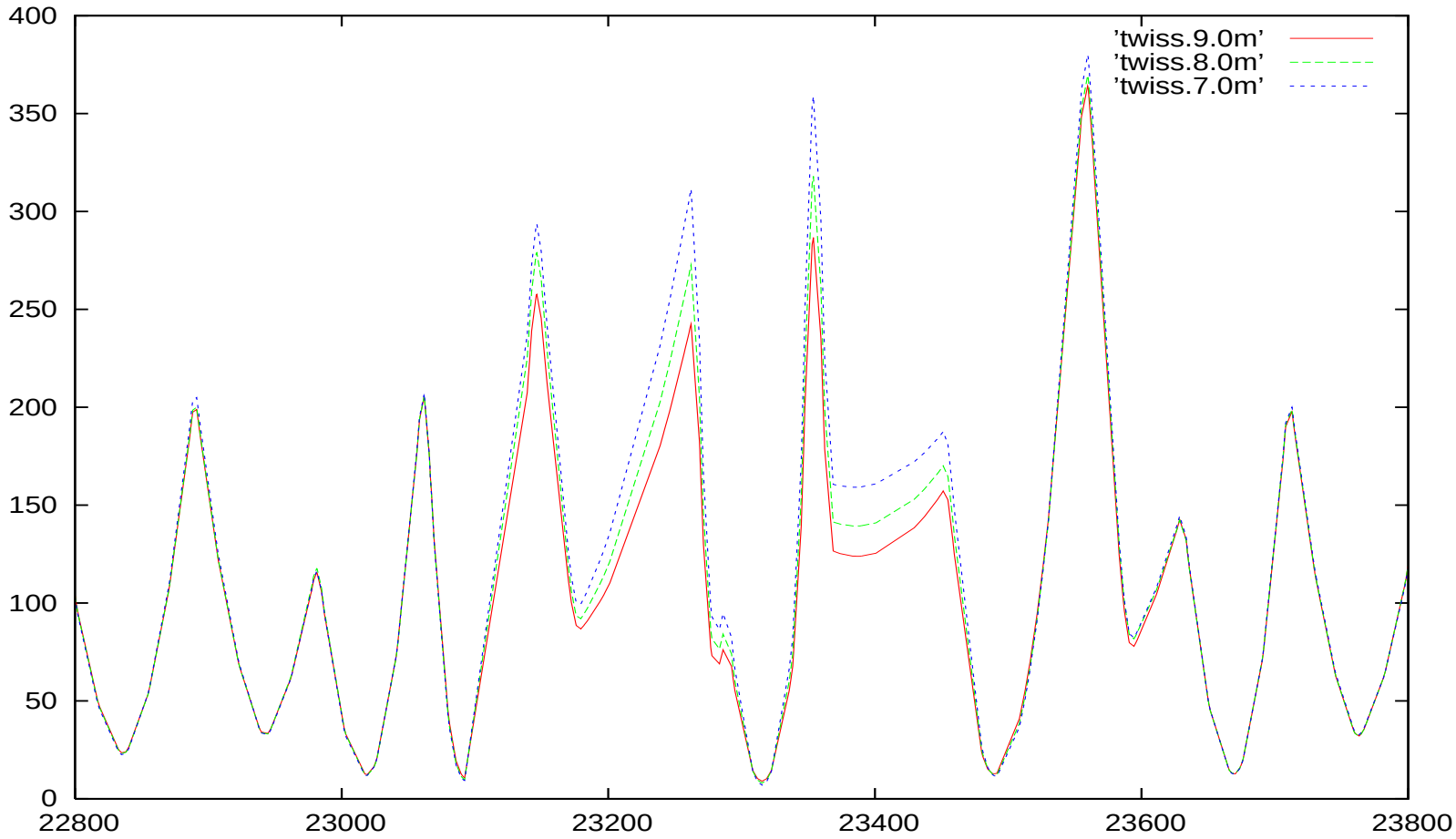
Steps in $\Delta\ \beta^*$ for squeeze

- **Present β^* squeeze in IP8:**
  - **10 m (nominal) to 2 m (low intensity)**
  - **From Malika: intermediate steps every 0.5 m**
- **Can we go to larger steps (e.g. 1 m) ?**
- **Interpolate between two points and compare with exact optics**
- **Check possible β-beating and optics mismatch**

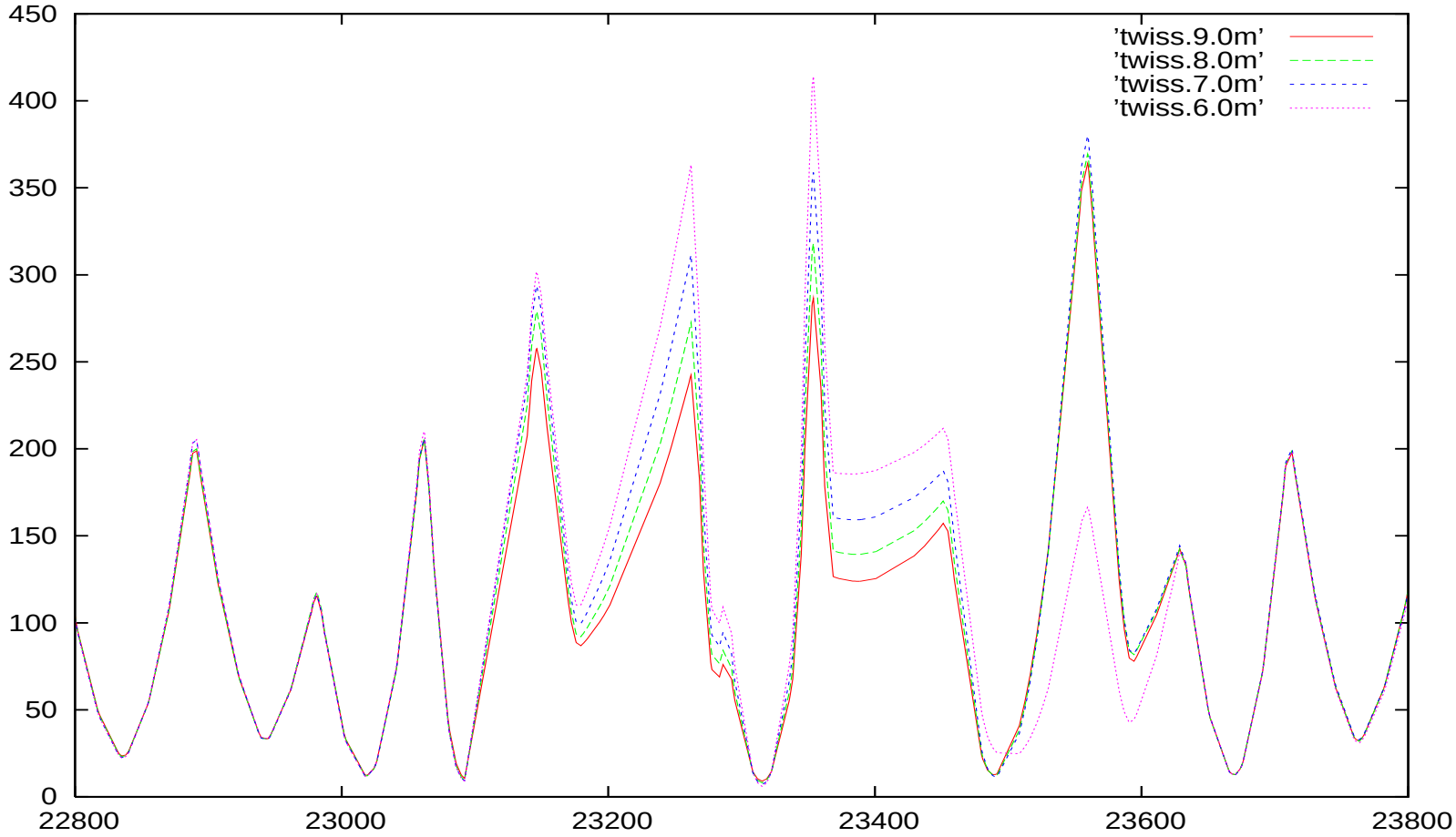
Example: β squeeze (β_x, beam 1)



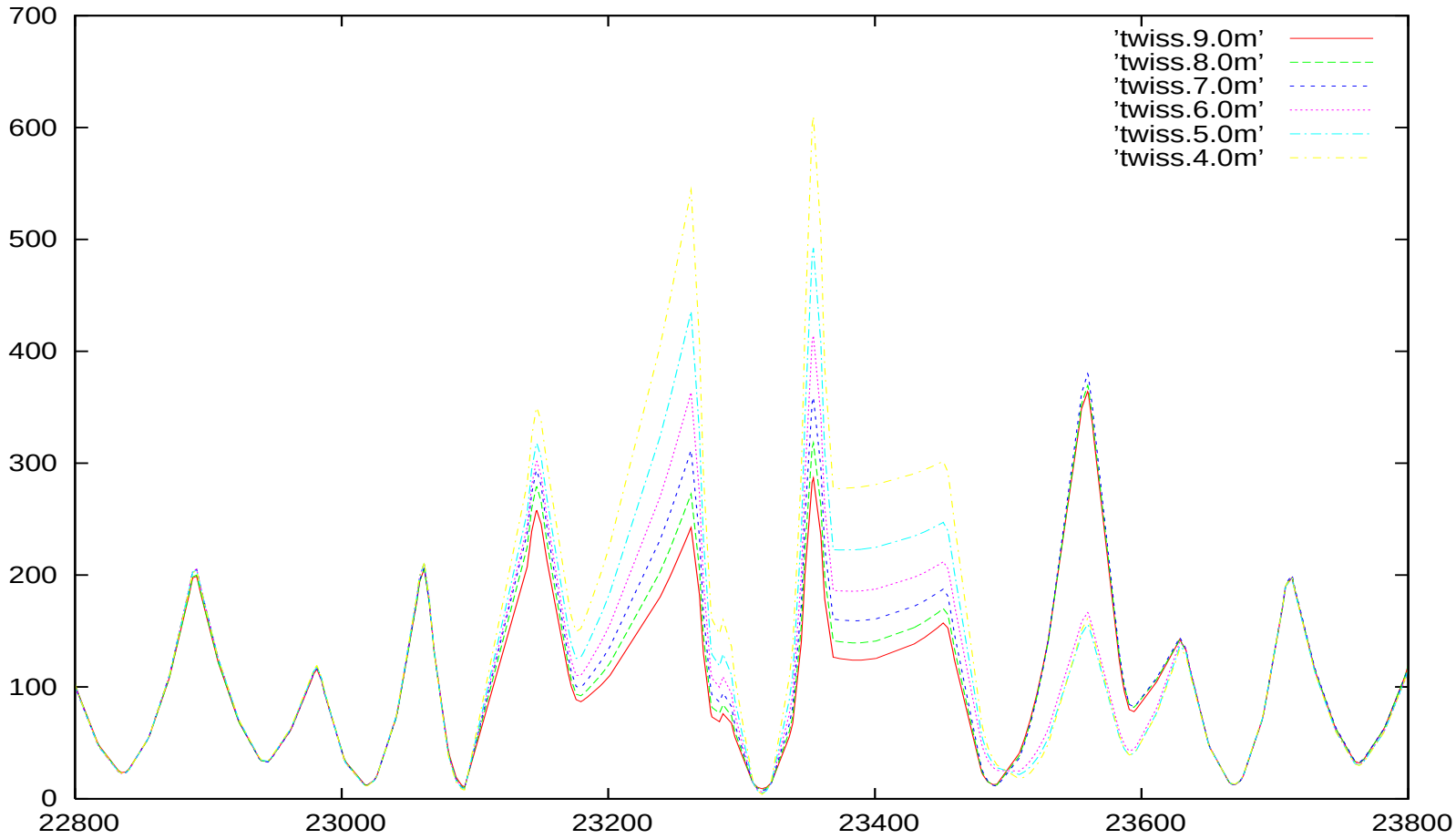
β squeeze



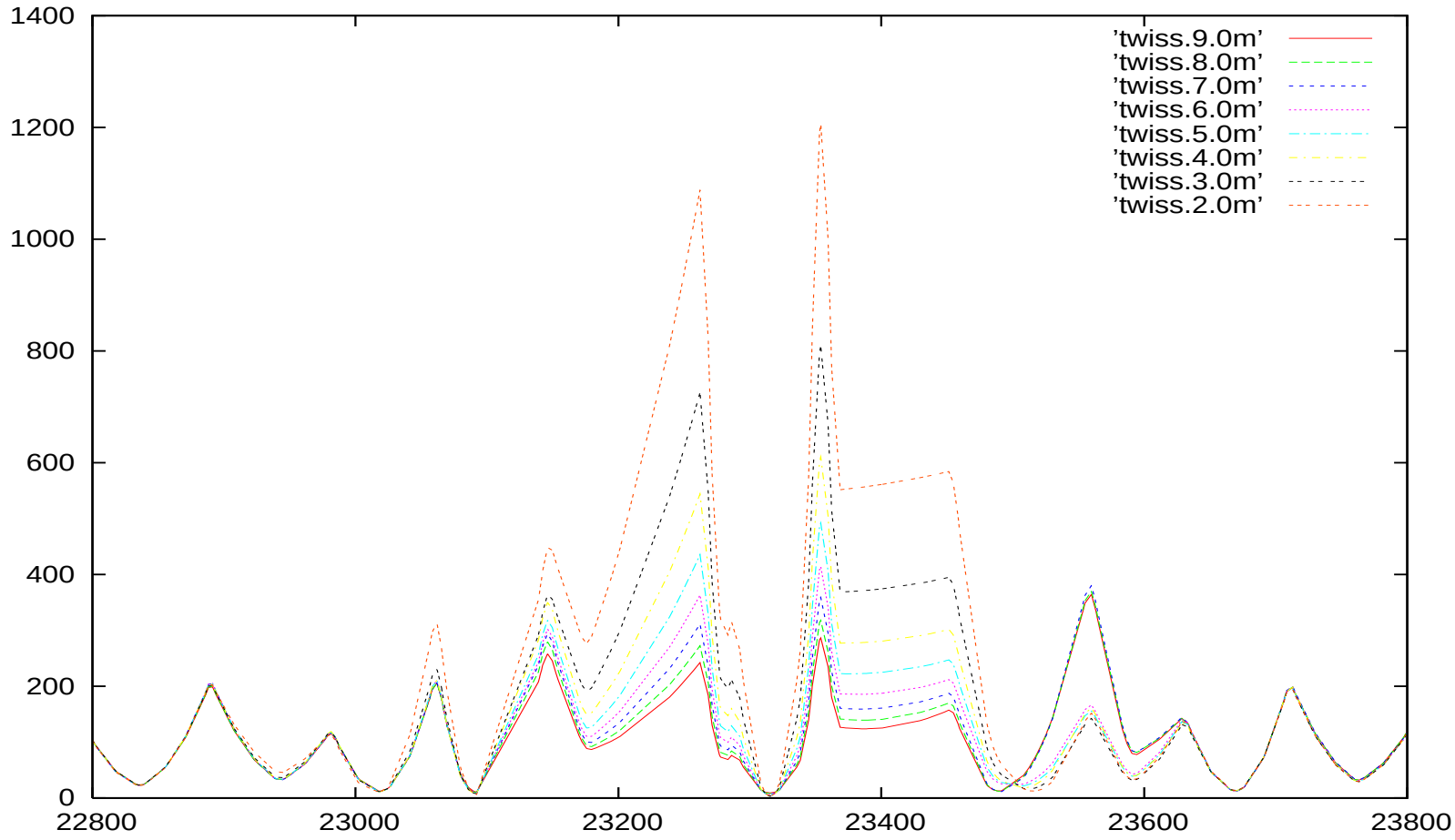
β squeeze



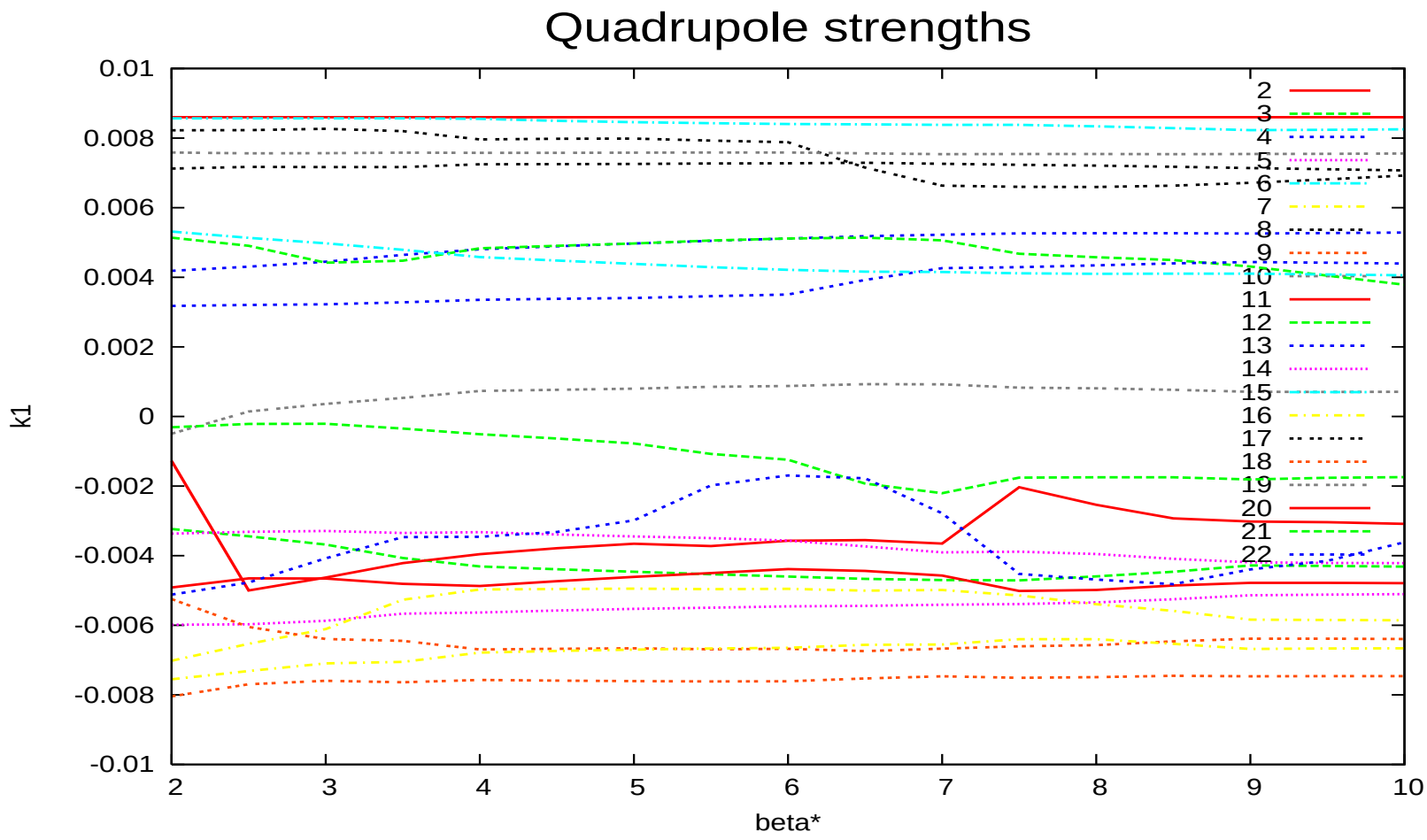
β squeeze



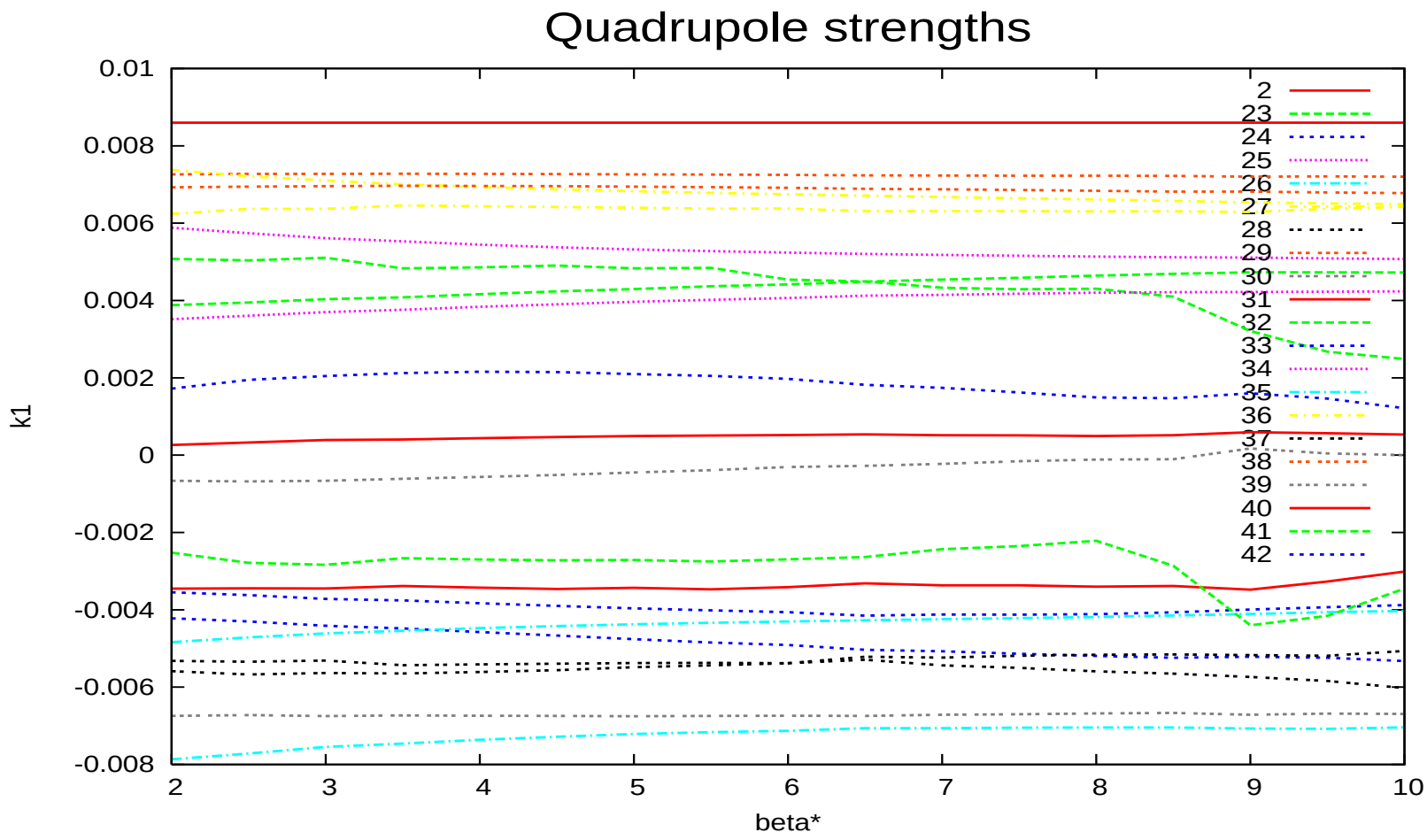
β squeeze



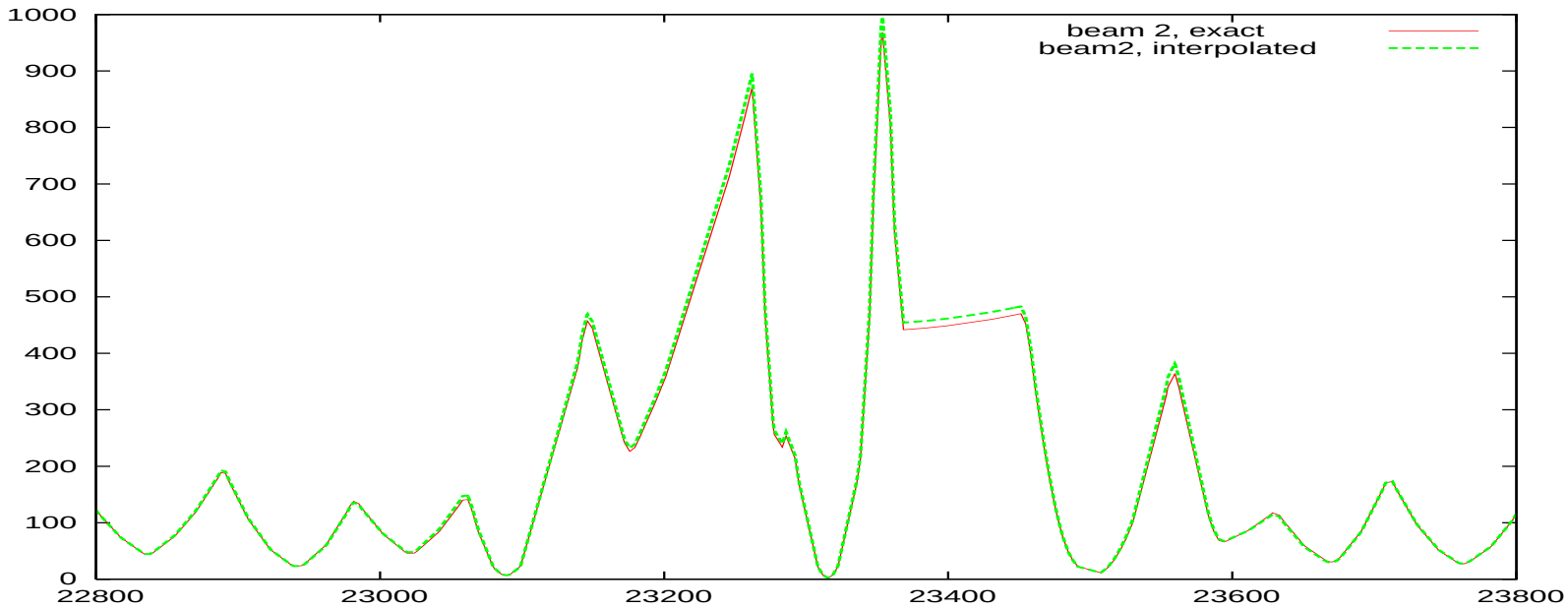
Quadrupole strengths beam 1



Quadrupole strengths beam 2

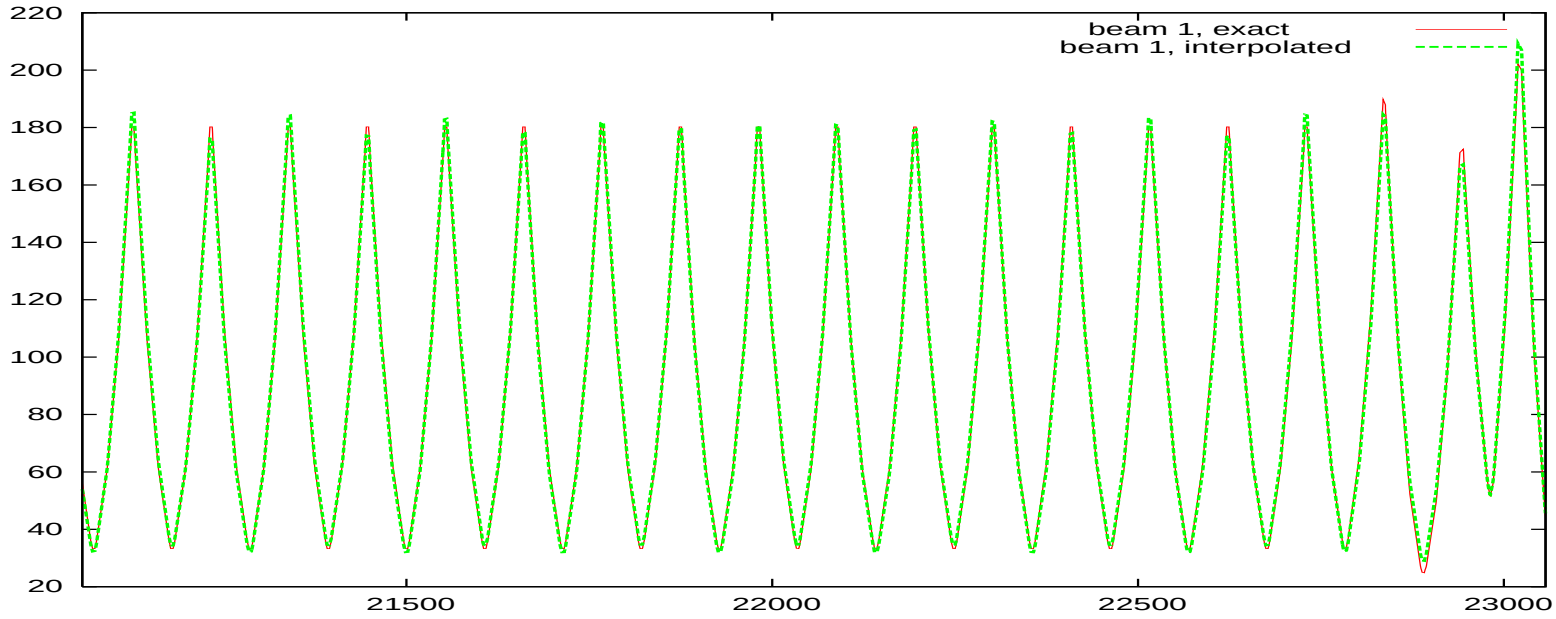


β_y interpolation



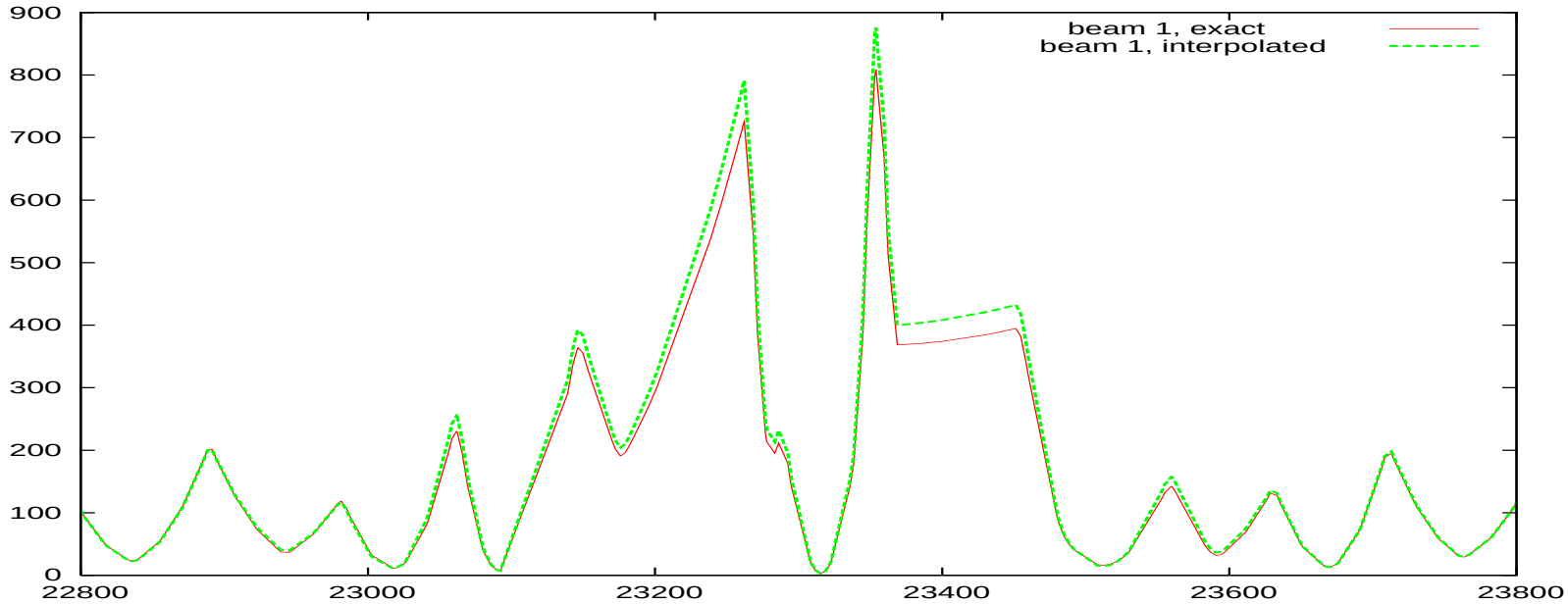
- β_y **3m and 2m interpolated to 2.5m**

β_y interpolation



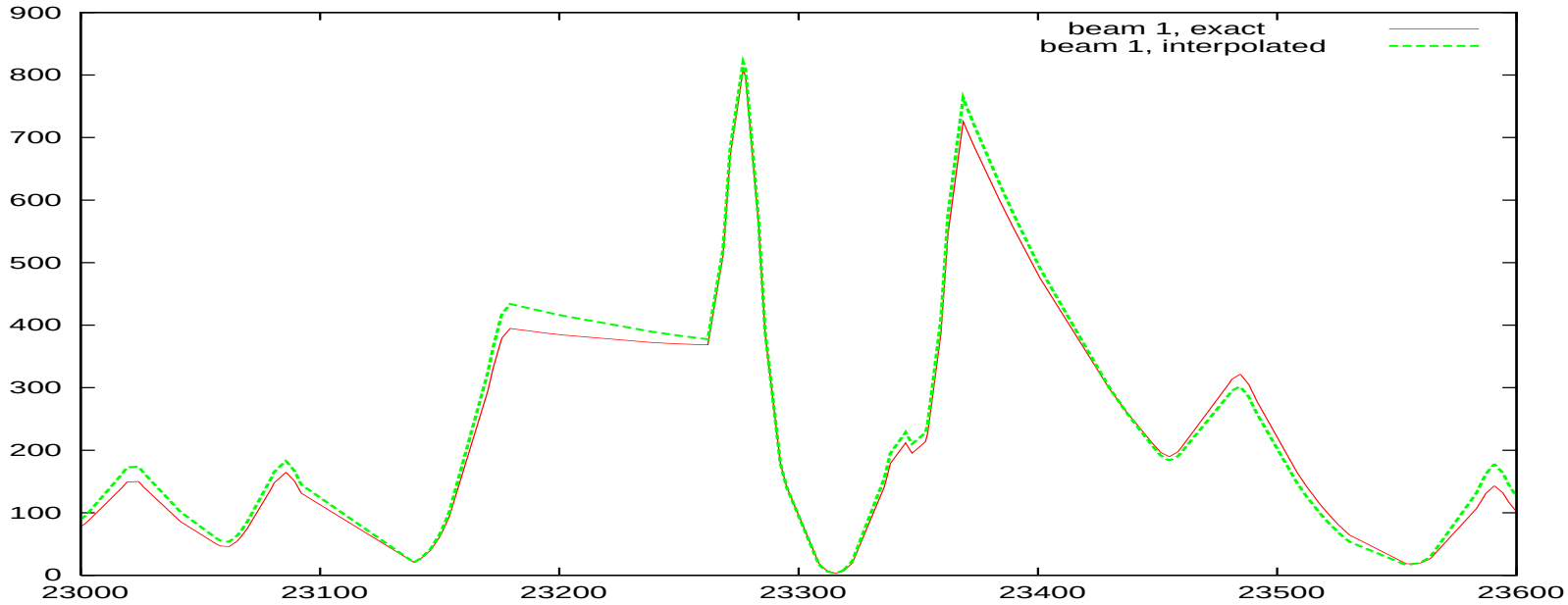
- β_y in ARC, 3m and 2m interpolated to 2.5m

β_x interpolation



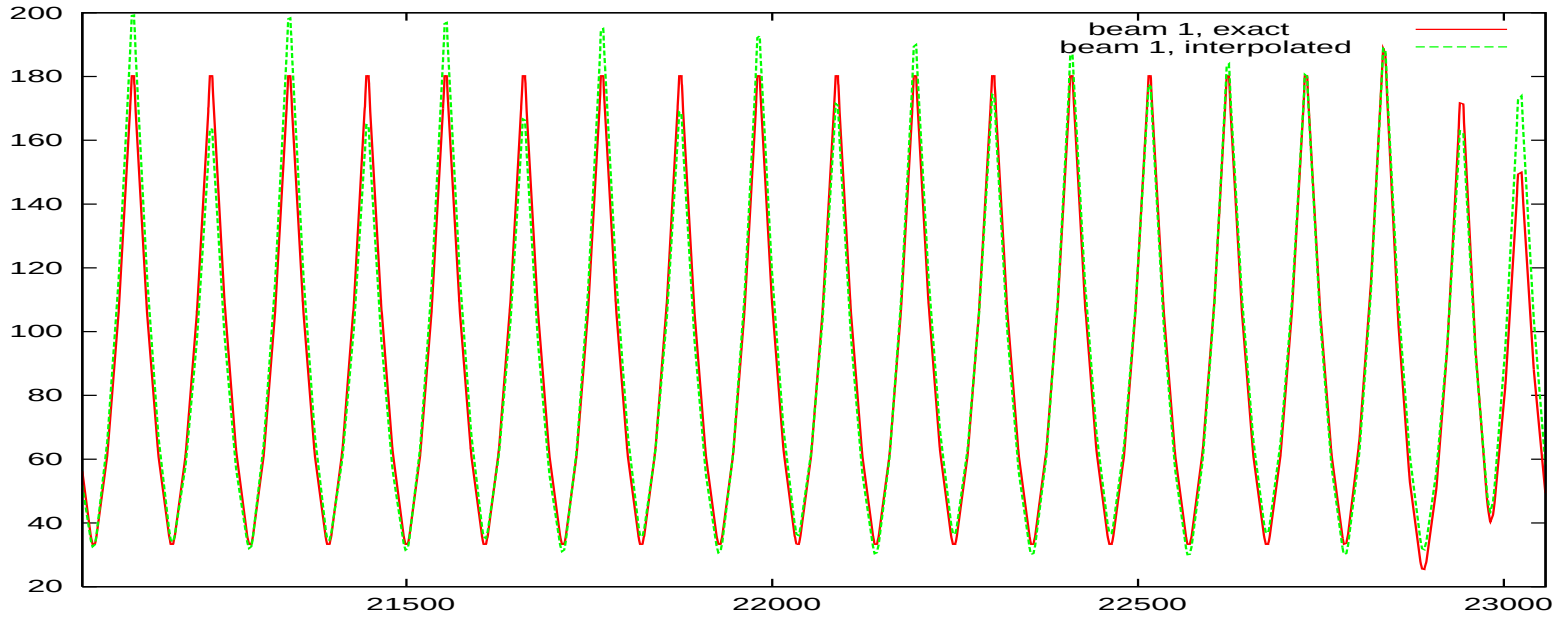
- β_x 4m and 2m interpolated to 3.0m

β_y interpolation



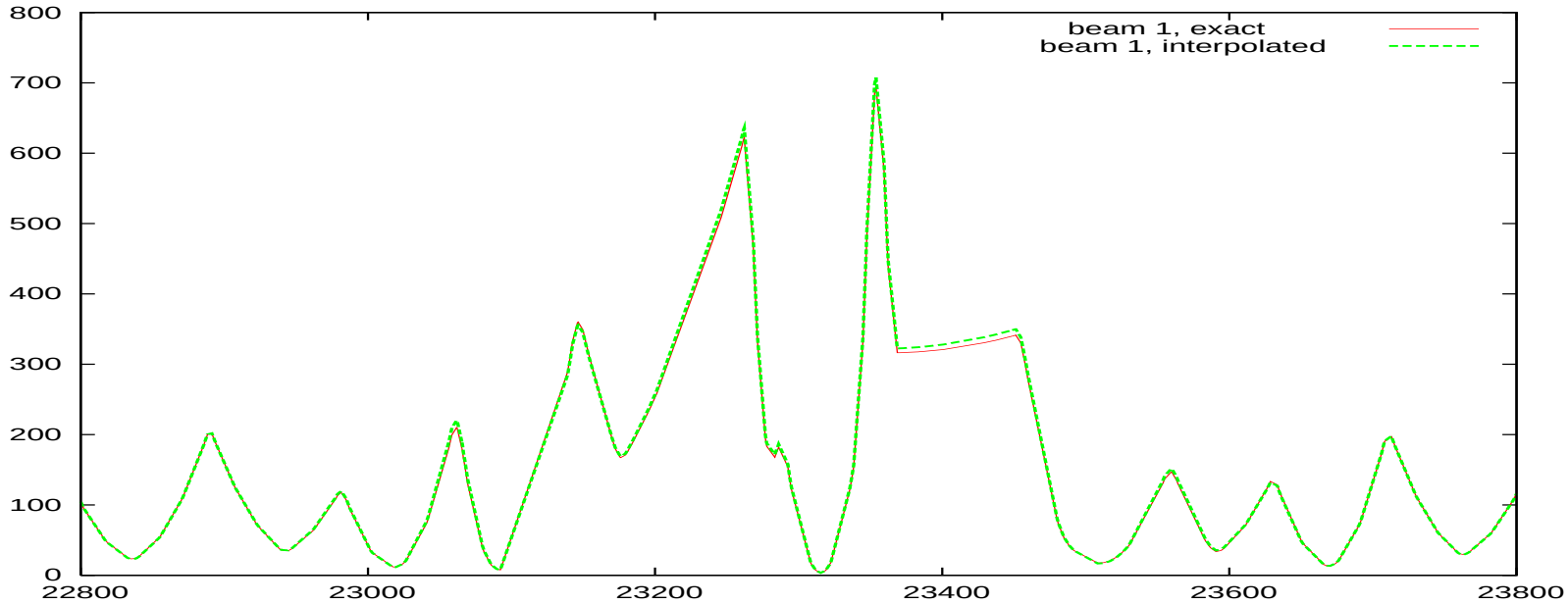
- β_y 4m and 2m interpolated to 3m

β_y interpolation



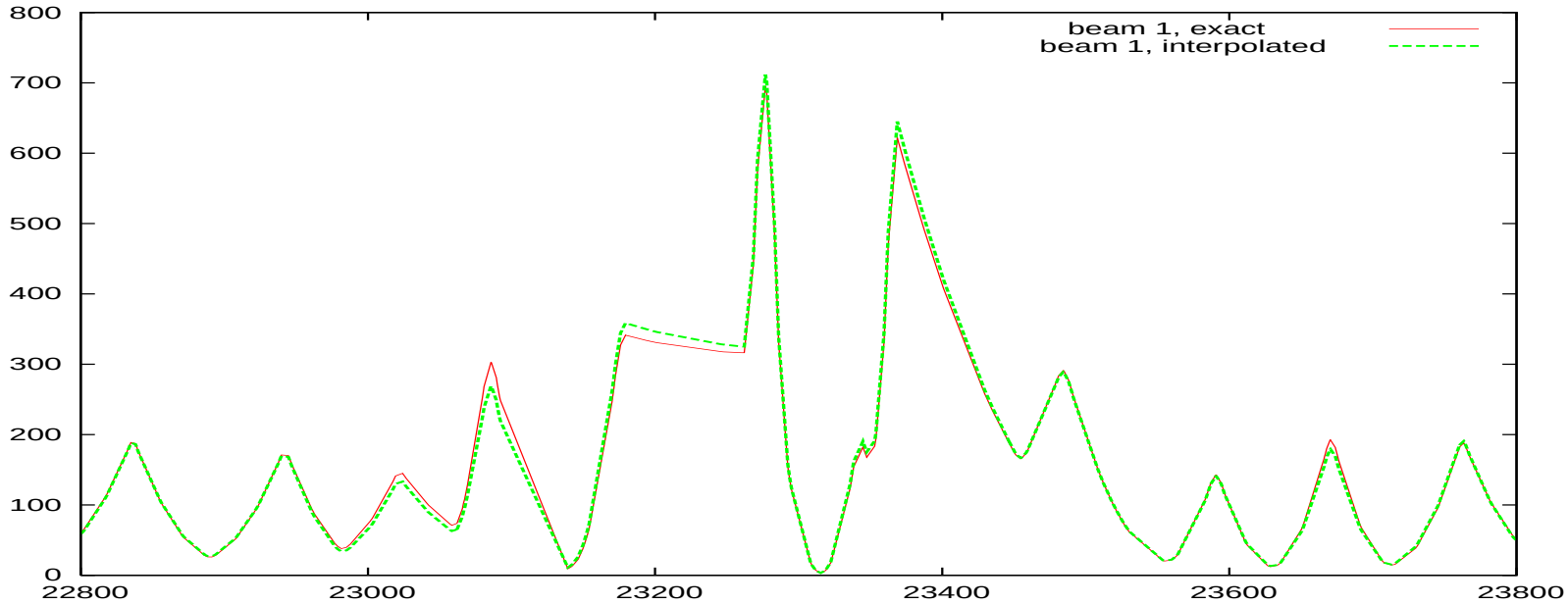
- β_y in ARC, 4m and 2m interpolated to 3.0m

β_x interpolation



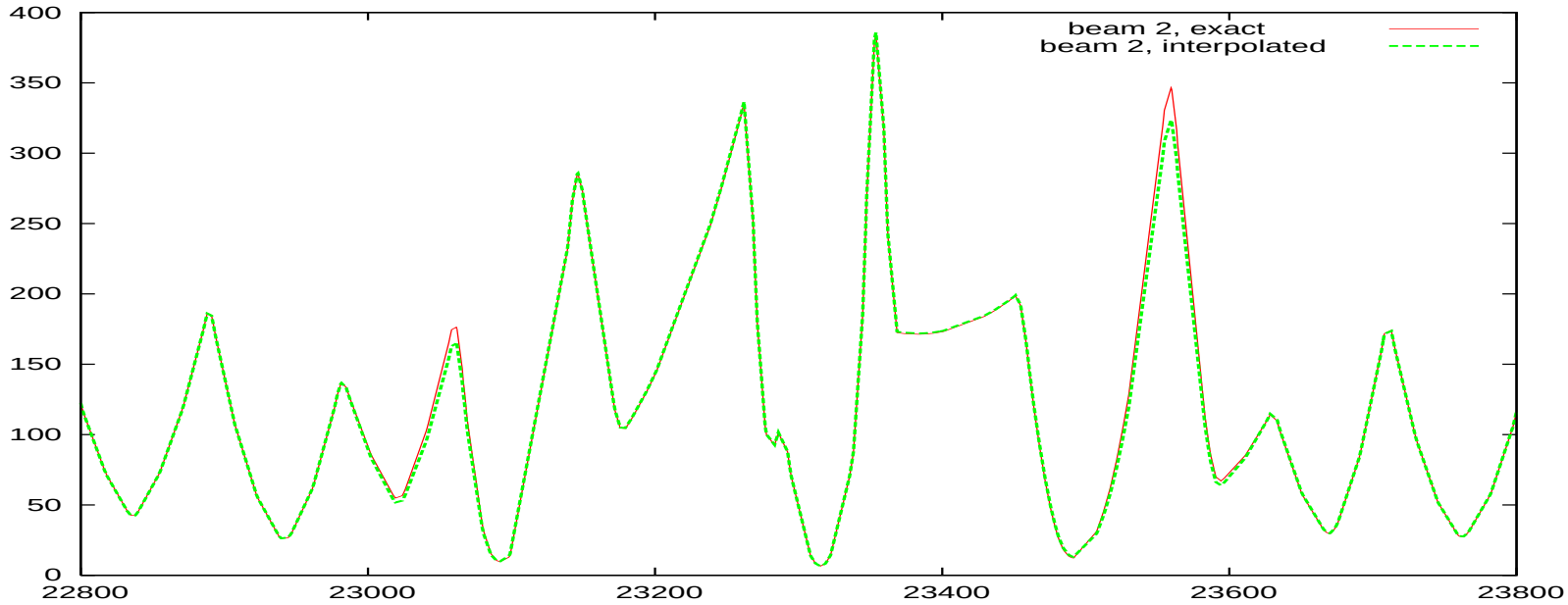
- β_x 3m and 4m interpolated to 3.5m

β_y interpolation



- β_y **3m and 4m interpolated to 3.5m**

β_y interpolation

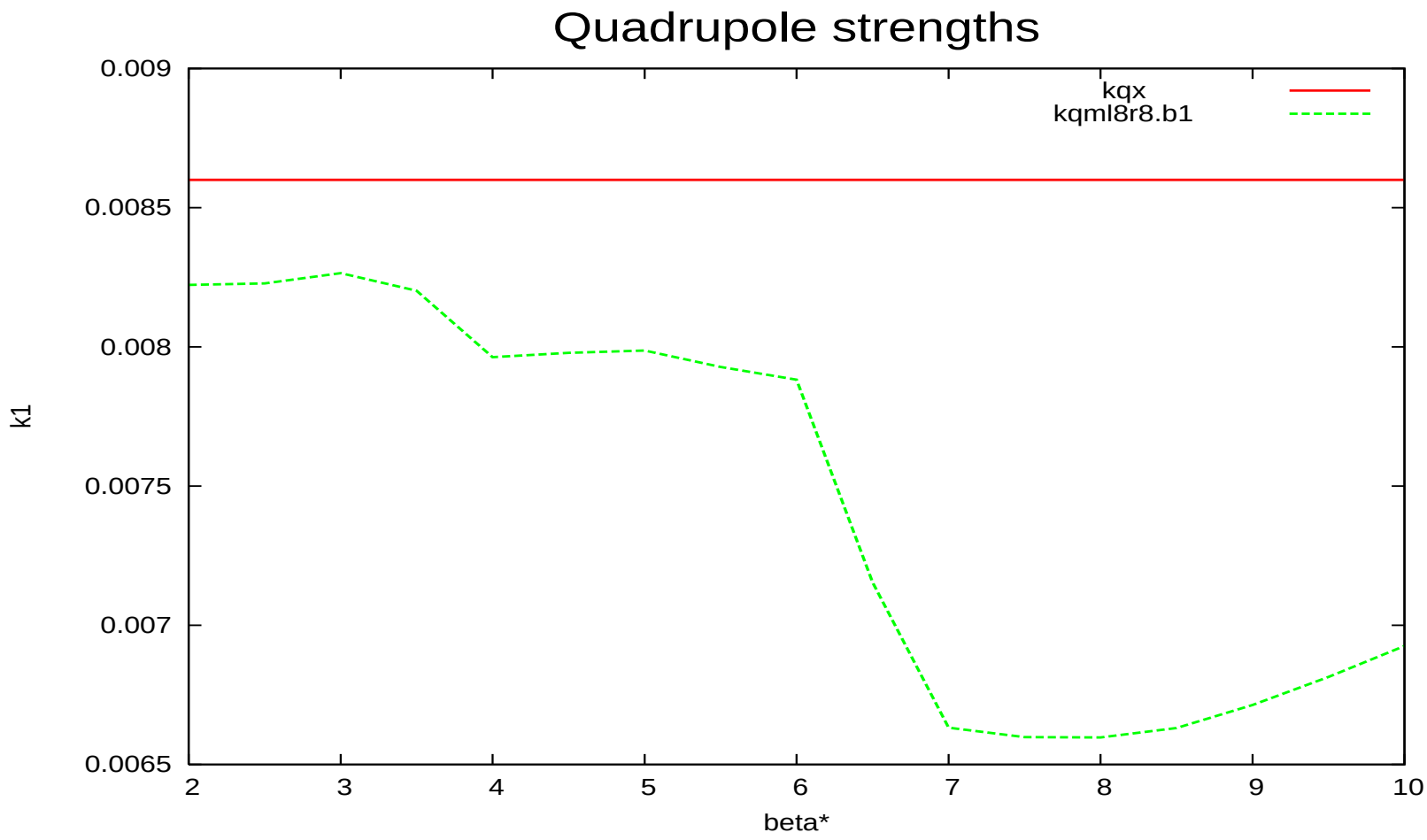


- β_y **6m and 7m interpolated to 6.5m**

β_x interpolation

Interpolation	β-beating $\left(\frac{\beta_t-\beta_i}{\beta_t}\right)_{max}$	ΔQ'
2,3 $\rightarrow$ 2.5m	5.0% (local)	$\approx$ 0.2
3,4 $\rightarrow$ 3.5m	4.5%	$\approx$ 0.1
4,5 $\rightarrow$ 4.5m	1.0%	$\approx$ 0.03
6,7 $\rightarrow$ 6.5m	7.0% (local)	$\approx$ 0.07
7,8 $\rightarrow$ 7.5m	1.0%	$\approx$ 0.02
9,10 $\rightarrow$ 9.5m	0.5%	$\approx$ 0.002
2,4 $\rightarrow$ 3.0m	10% (in arc !)	$\approx$ 0.5
8,10 $\rightarrow$ 9.0m	3.5%	$\approx$ 0.02

Summary

- **For steps of $\Delta\beta^* = 1$m:**
  - **β-beating small for $\beta^* \geq 4$ m**
  - **Optics changes (tune, chromaticity) very small**
- **$\Delta\beta^* = 1$ m o.k**
- **Maybe for last steps (and 6m $\rightarrow$ 7m) $\Delta\beta^* = 0.5$ m**
- **Other issues: crossing schemes during pre-/squeeze**

Quadrupole strengths beam 1