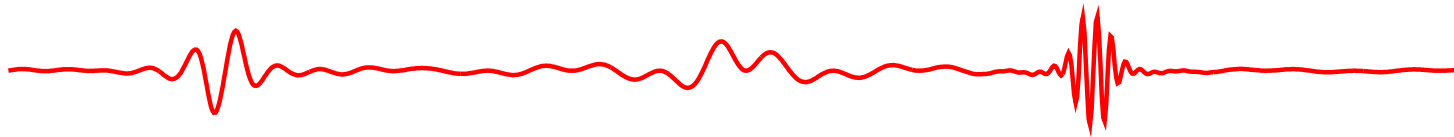


2011 Optics measurements & corrections



The β -beating team: M. Aiba, R. Calaga,
R. Miyamoto, R. Tomás and G. Vanbavinckhove

Thanks to V. Kain, M. Lamont, S. Redaelli and
F. Schmidt

March 2011

Contents

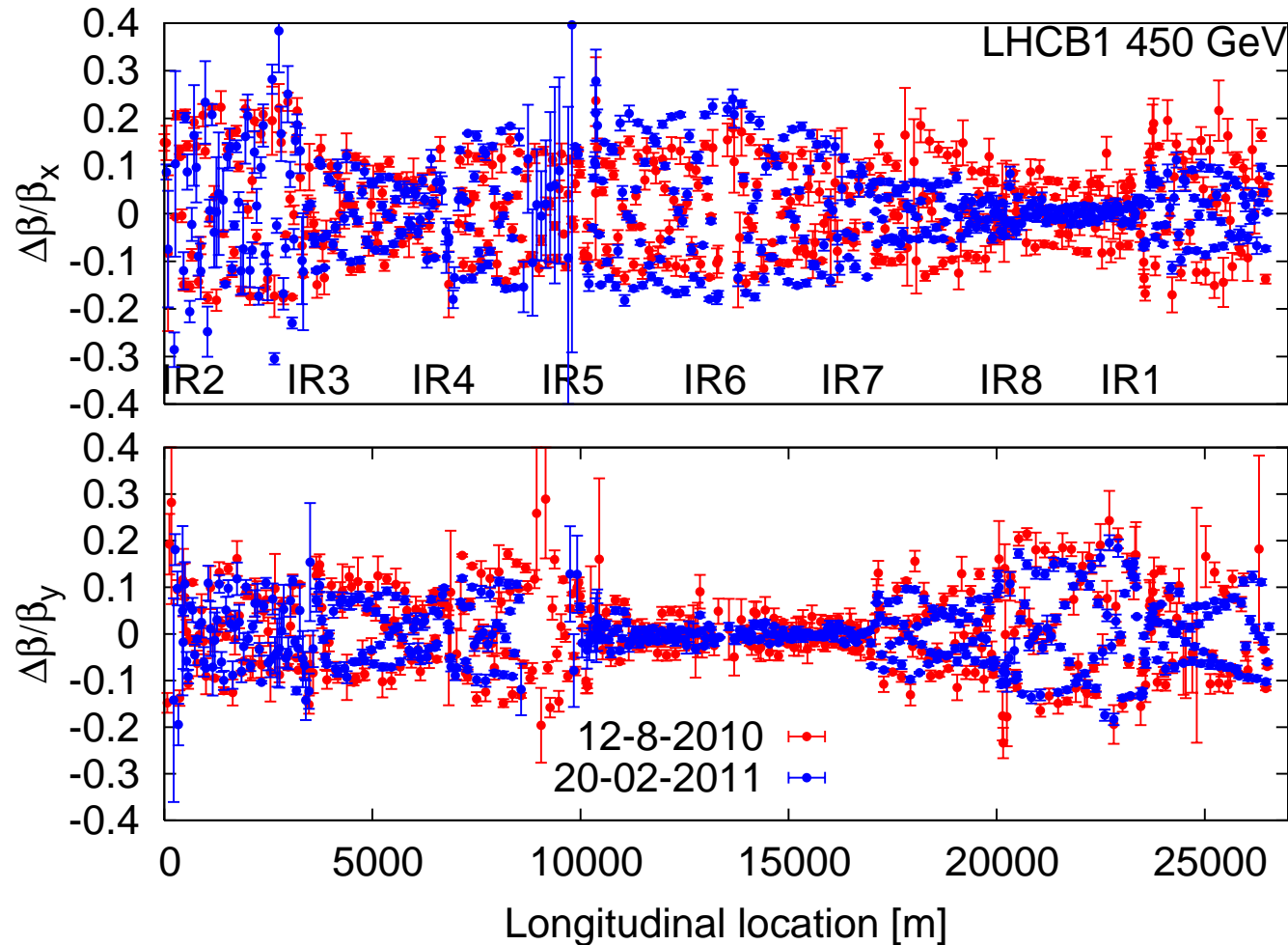
- ★ News
- ★ Injection optics reproducibility
- ★ Measurements & corrections (local & global) during the squeeze
- ★ IR coupling correction

News

During the technical stop:

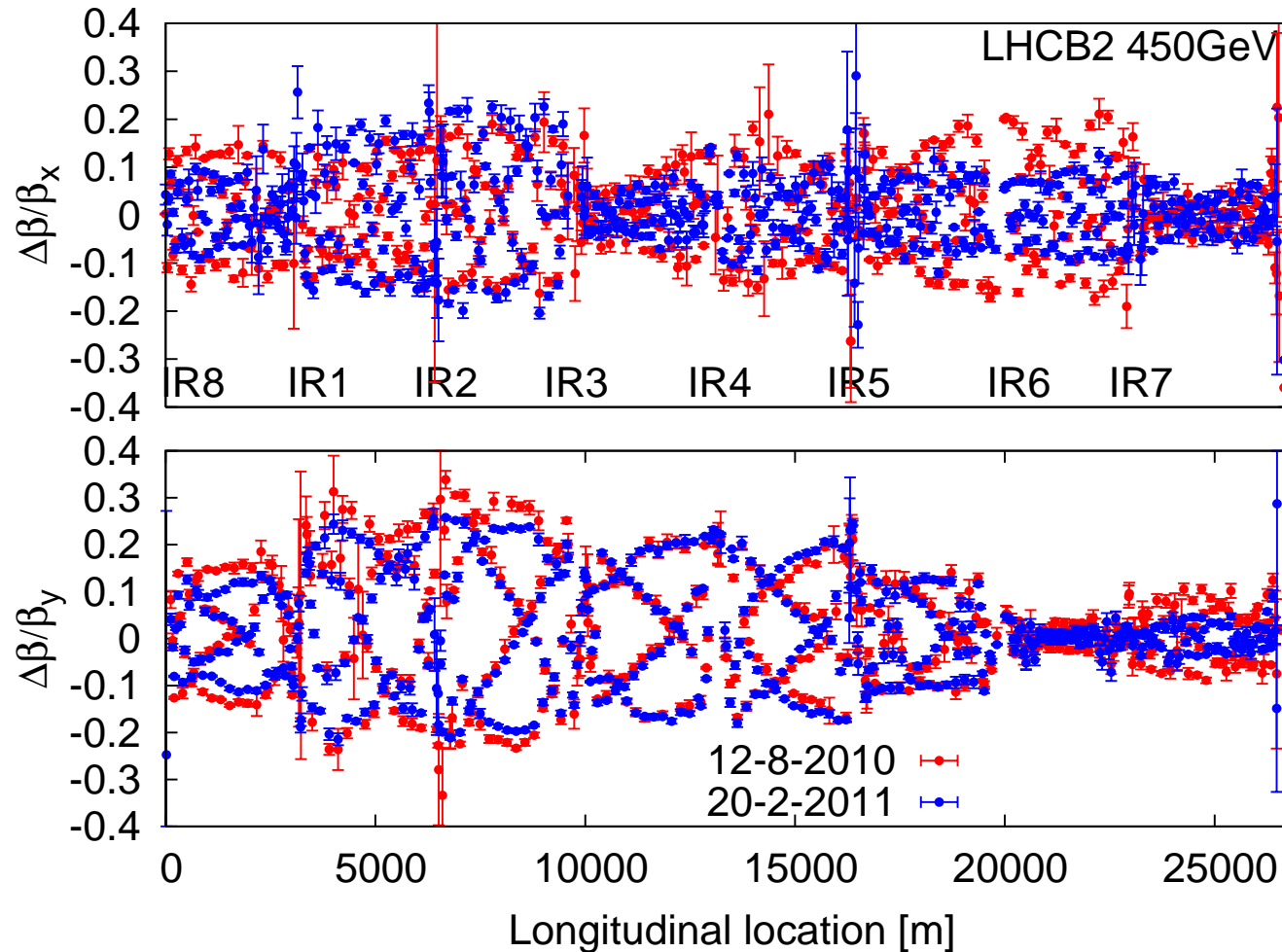
- ★ codes have been made faster
- ★ GUI has become more user-friendly
- ★ new more precise analyses
- ★ new home-made database (under preparation)
- ★ request to have a longer AC dipole flat plateau to improve measurement resolution.

β -beating at injection: 2011 Vs 2010



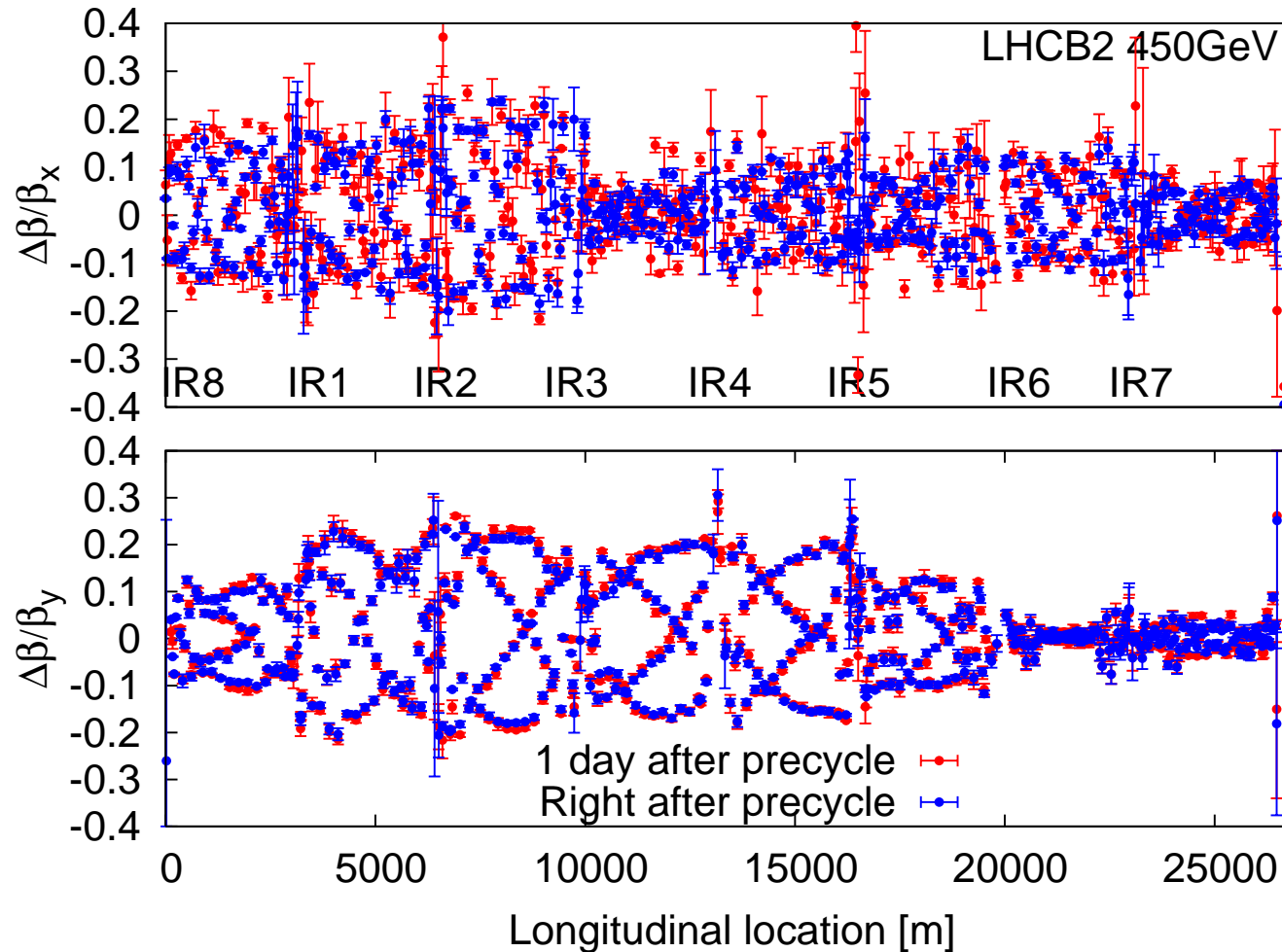
Differences in the 10% level.

β -beating at injection: 2011 Vs 2010



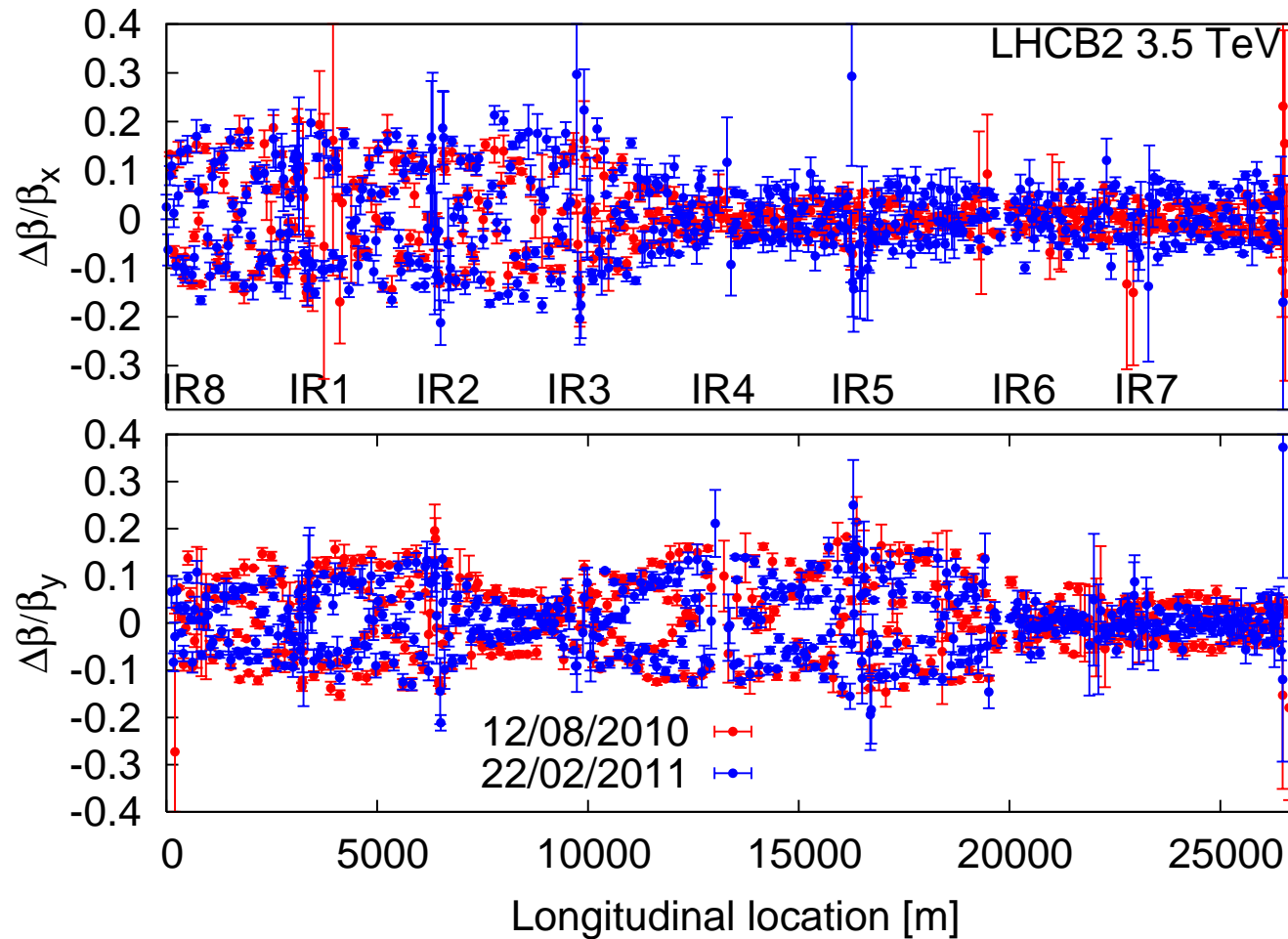
Same 10% difference for Beam2.

Dynamic β -beating at injection?



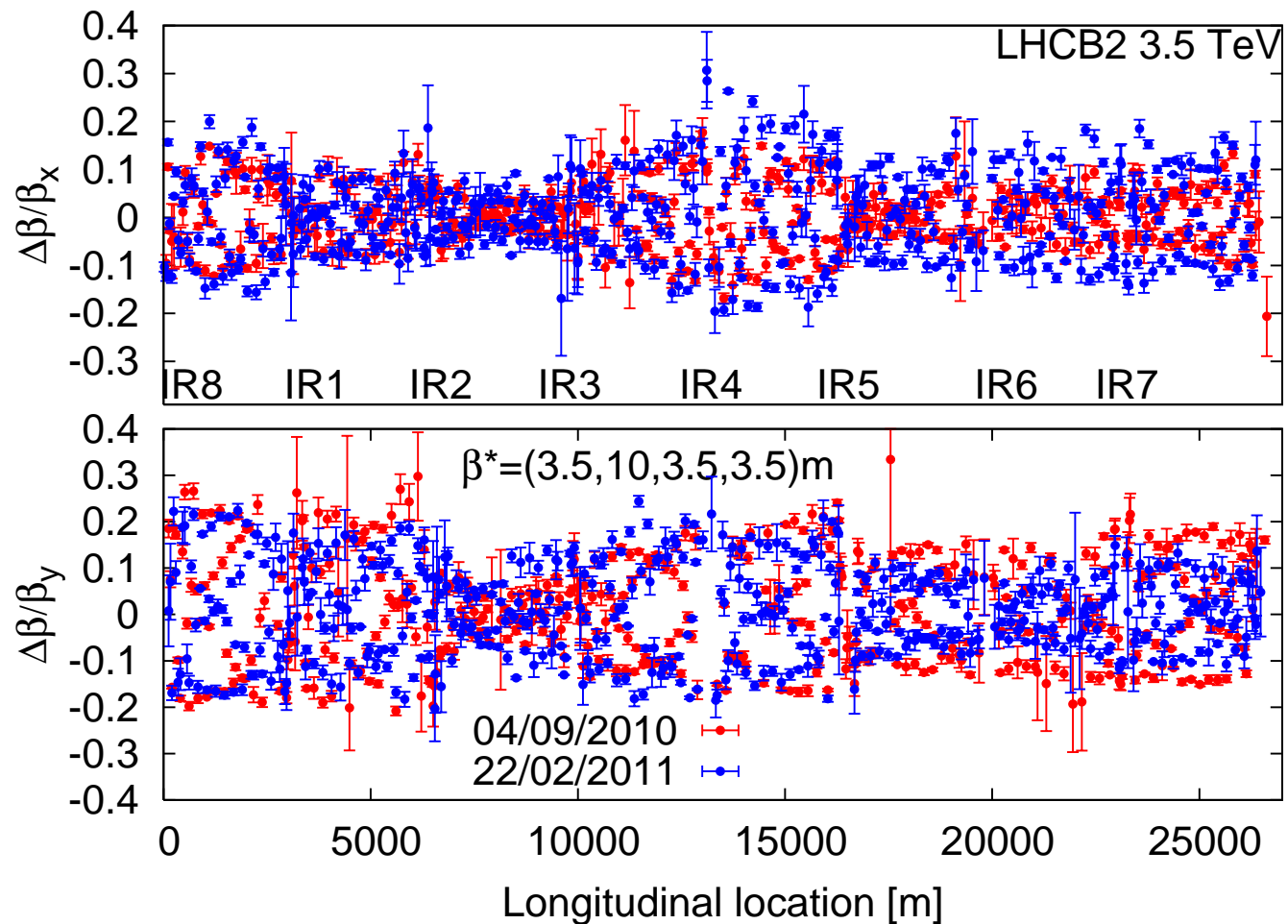
Basically no relevant dynamic β -beating at injection!

Flattop, 2010 Vs 2011



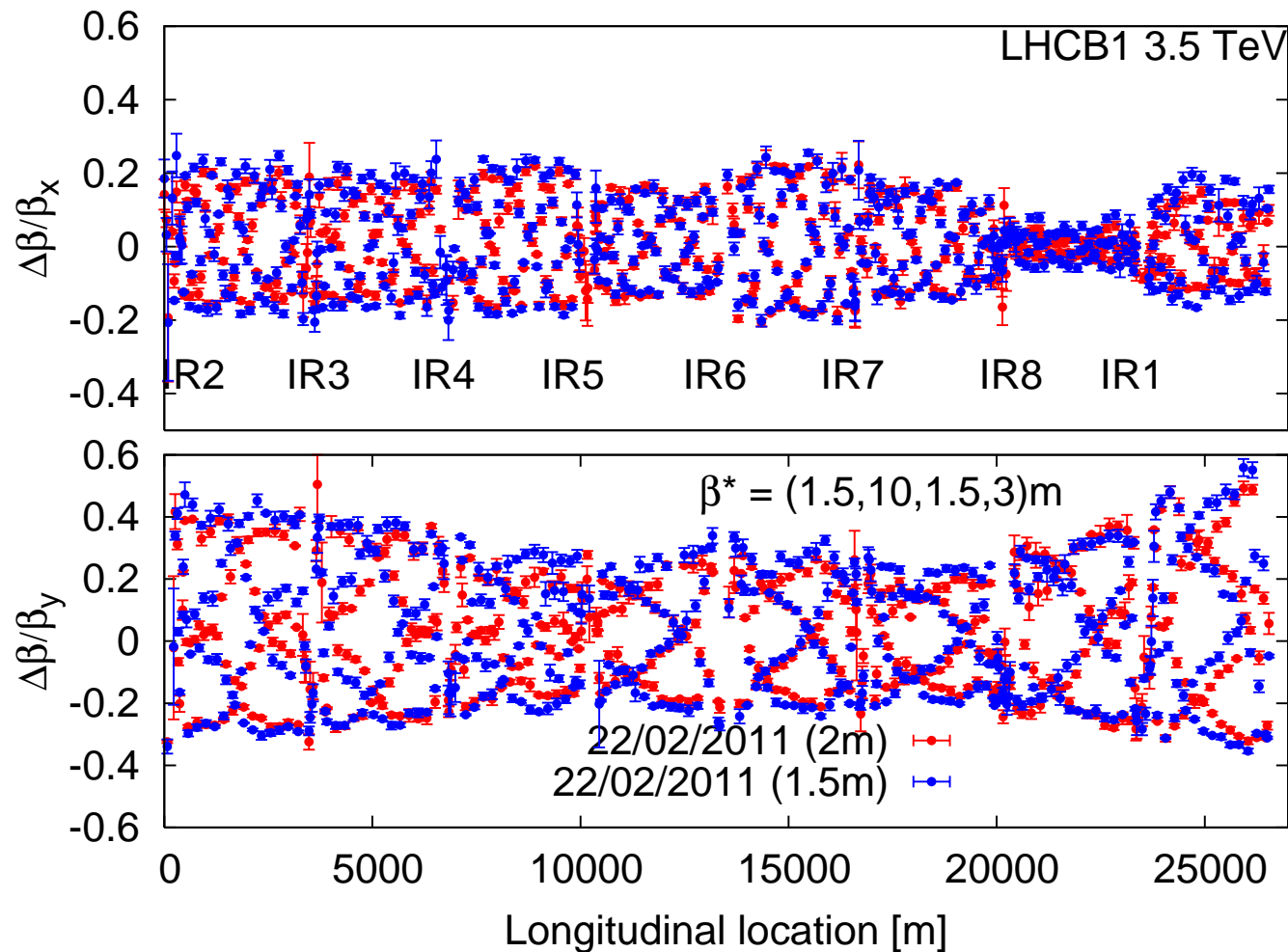
Small differences.

$\beta^* = 3.5\text{m}$, 2010 Vs 2011



Small differences.

$\beta^* = 1.5\text{m} \text{ \& } 2\text{m}, 2011$



Getting to the 60% beta-beating!

Local corrections during the squeeze

Local corrections are found to work similarly between $\beta^* = 3.5\text{m}$ and 1.5m in IR1, IR5, IR6 and IR8:

$$kq9.11b1 = kq9.11b1 * 0.994;$$

$$ktqx2.r1 = -.8e-5;$$

$$ktqx2.15 = 1e-5;$$

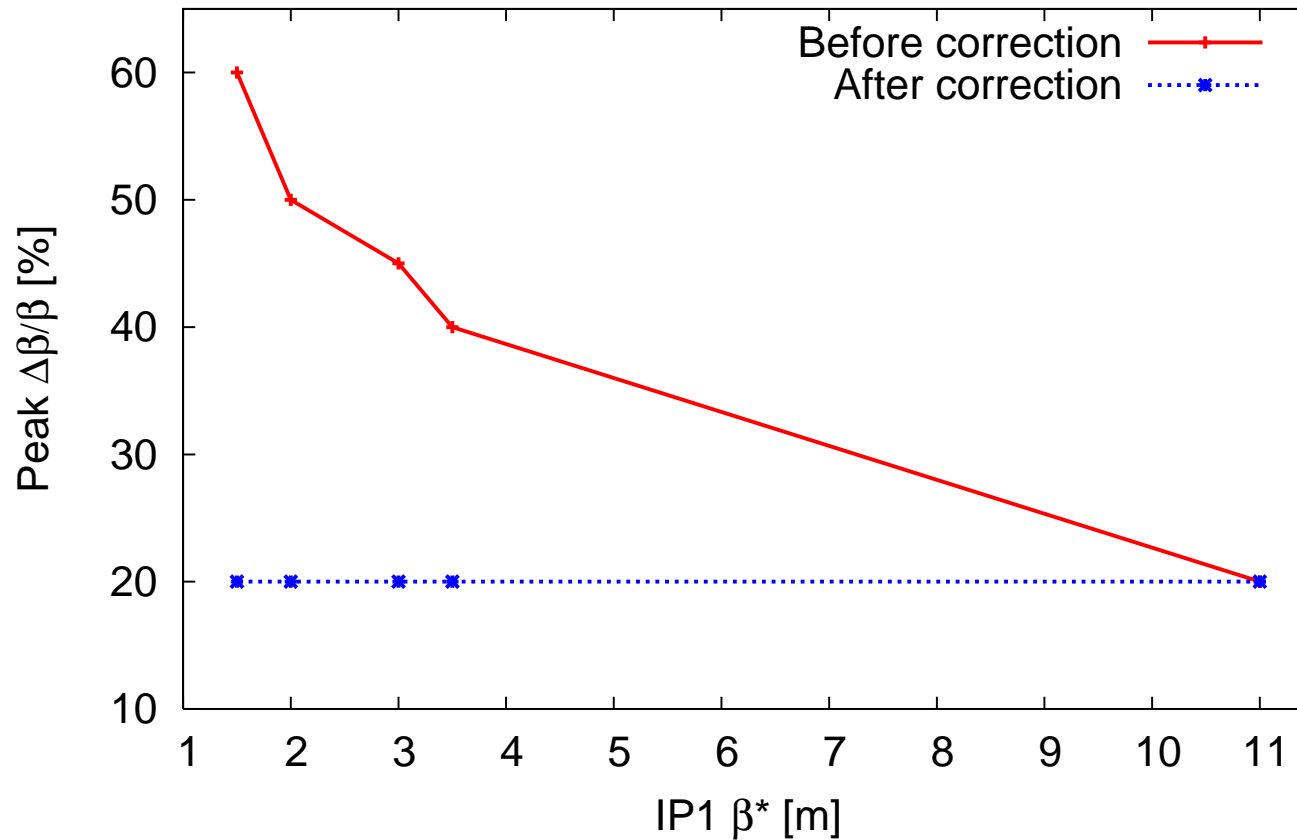
$$ktqx2.r5 = 1.3e-5;$$

$$kq5.16b2 = kq5.16b2 * 0.993;$$

$$ktqx2.18 = -2.293e-5;$$

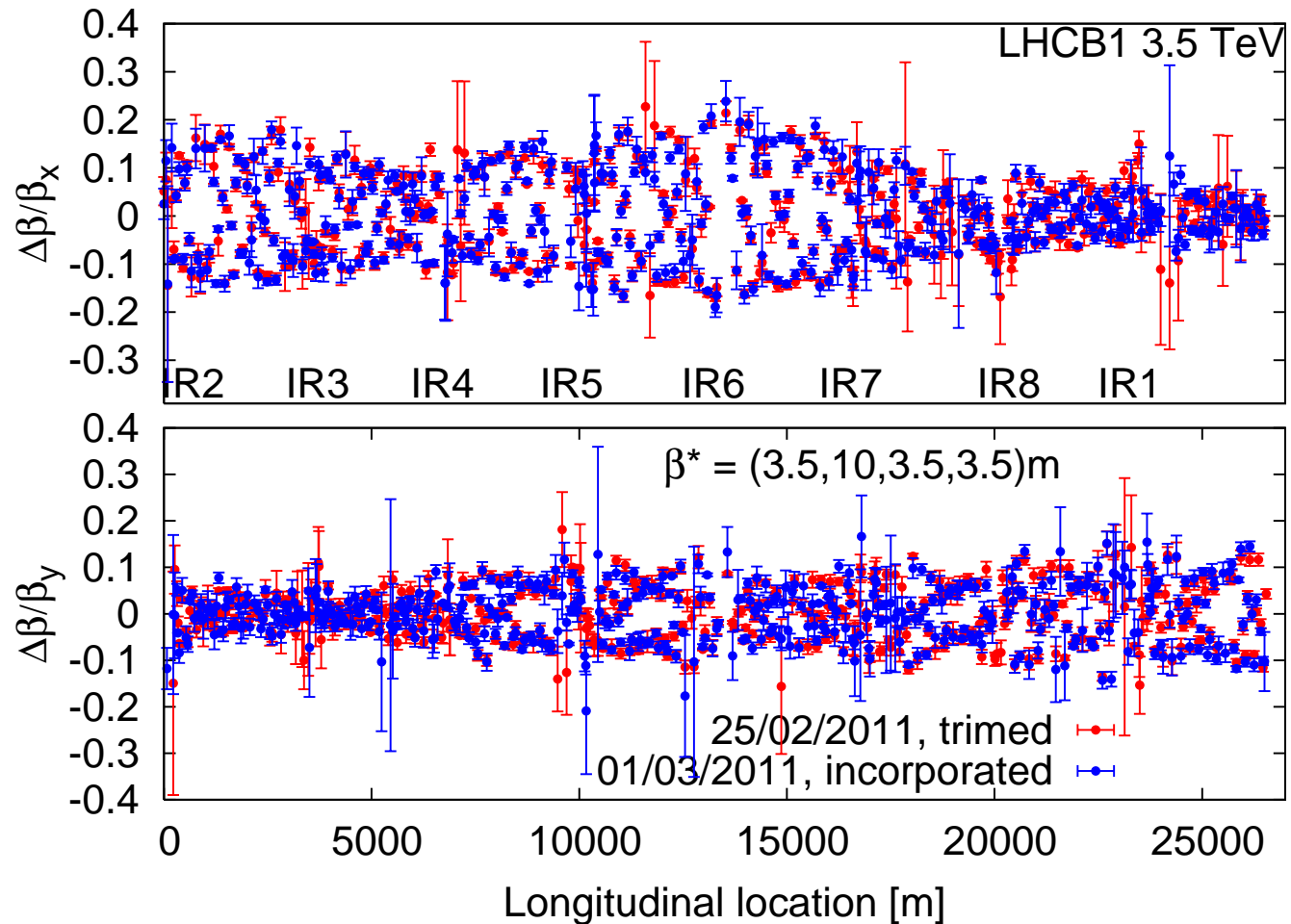
$$ktqx2.r8 = -5.29207e-6;$$

Local correction summary



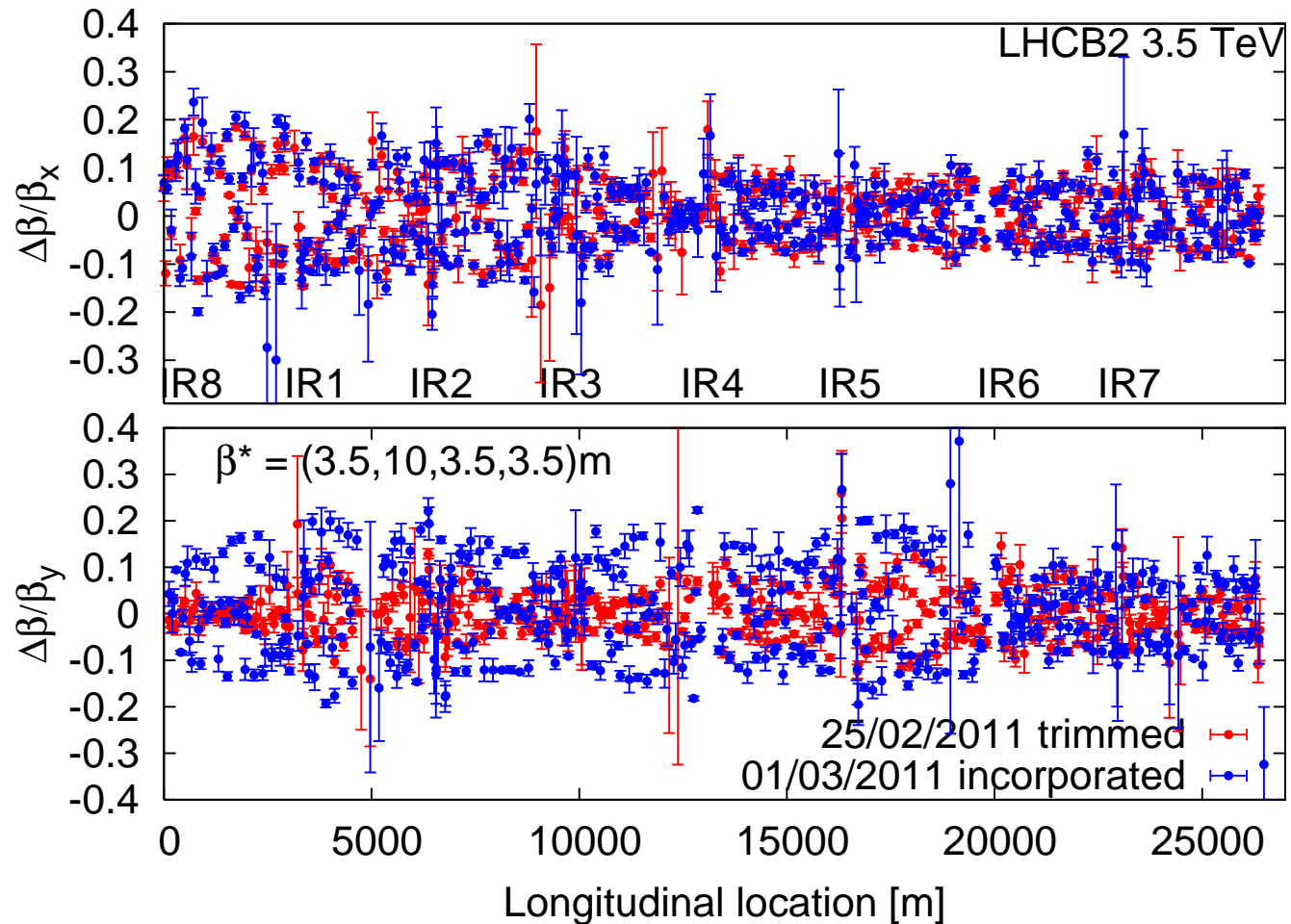
Excellent!

Trim Vs incorporation, Beam1



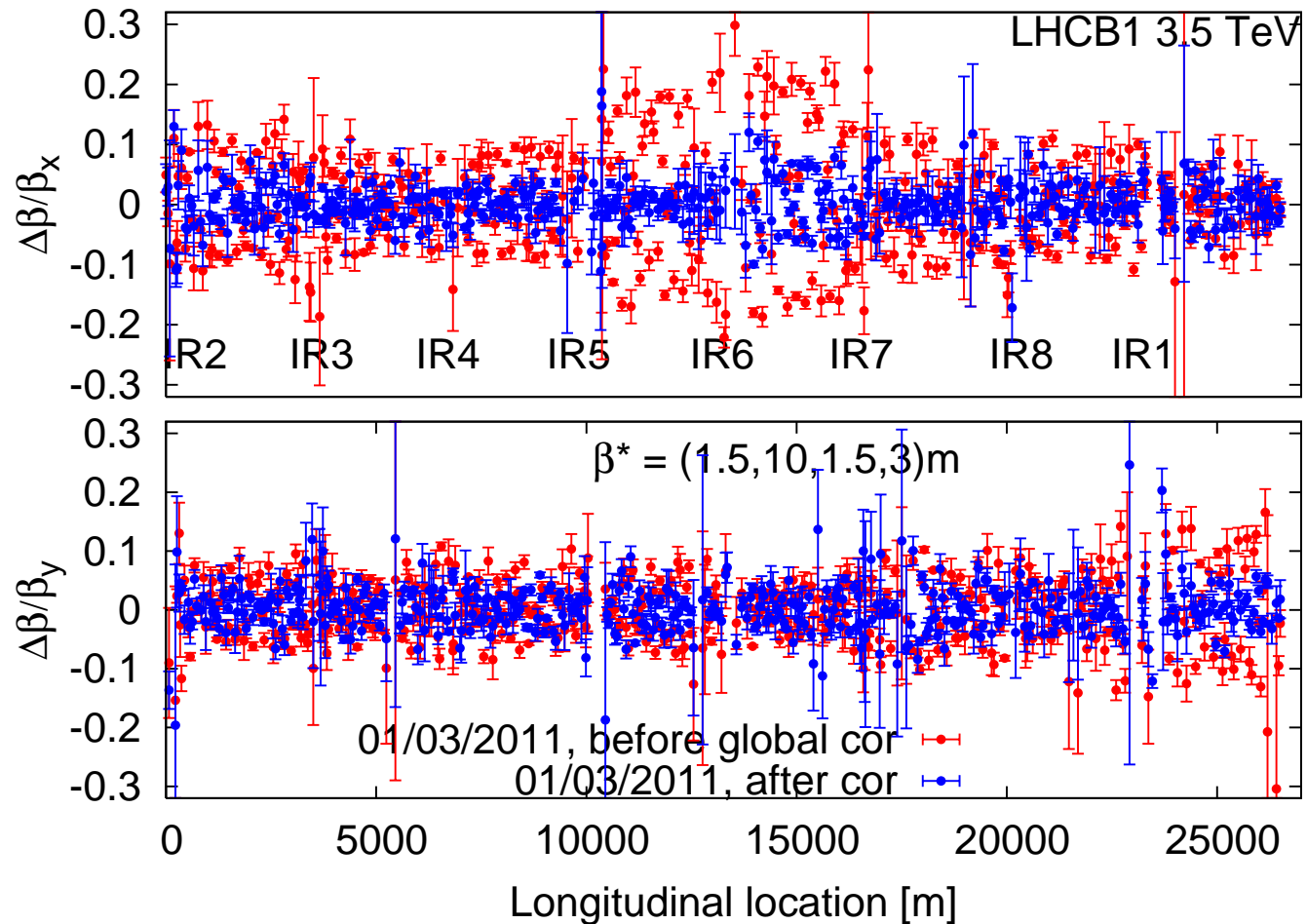
No difference between trim & incorporation!

Trim Vs incorporation, Beam2



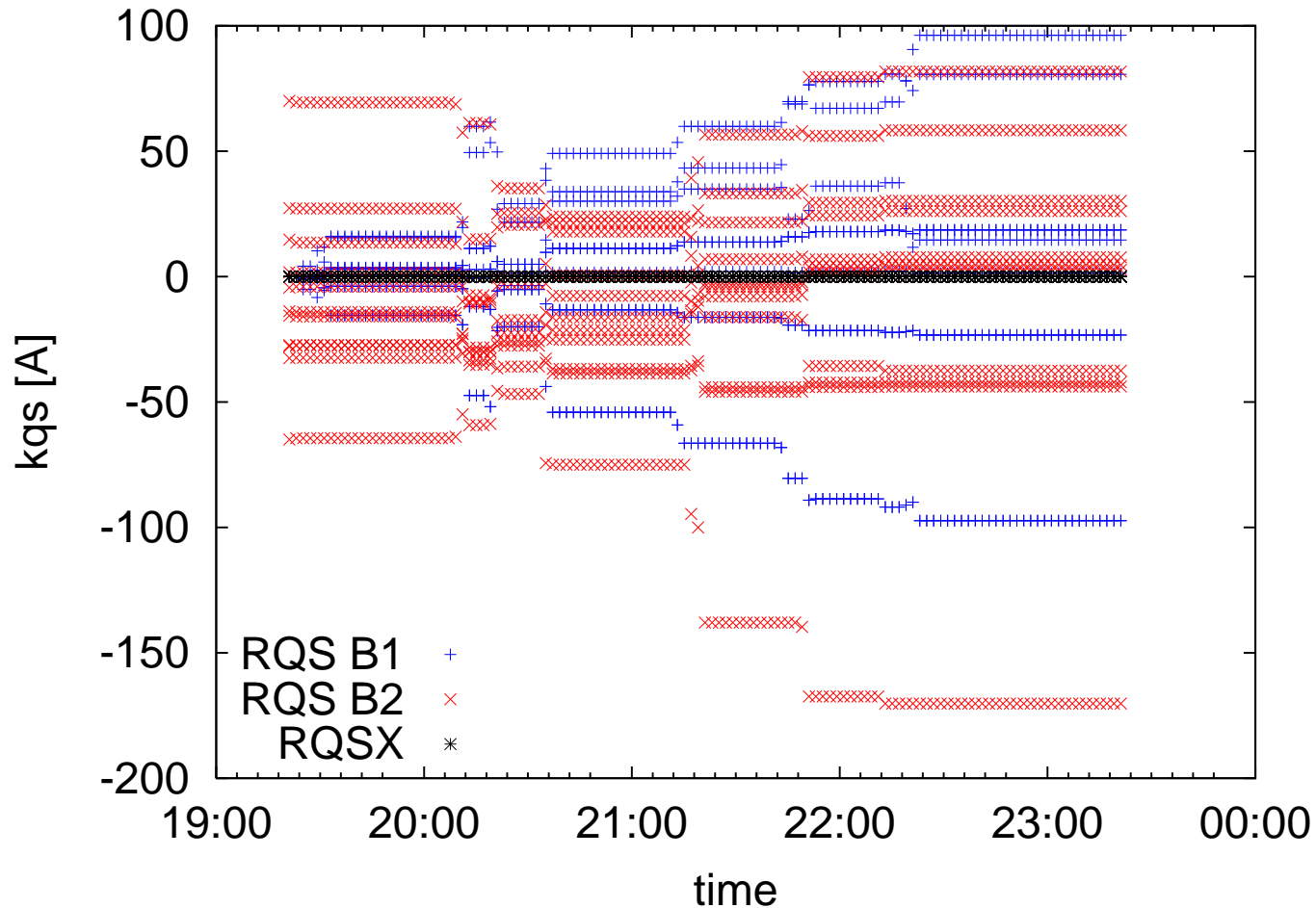
... IR6 quadrupole was not driven...

Beam1 global correction at $\beta^* = 1.5\text{m}$



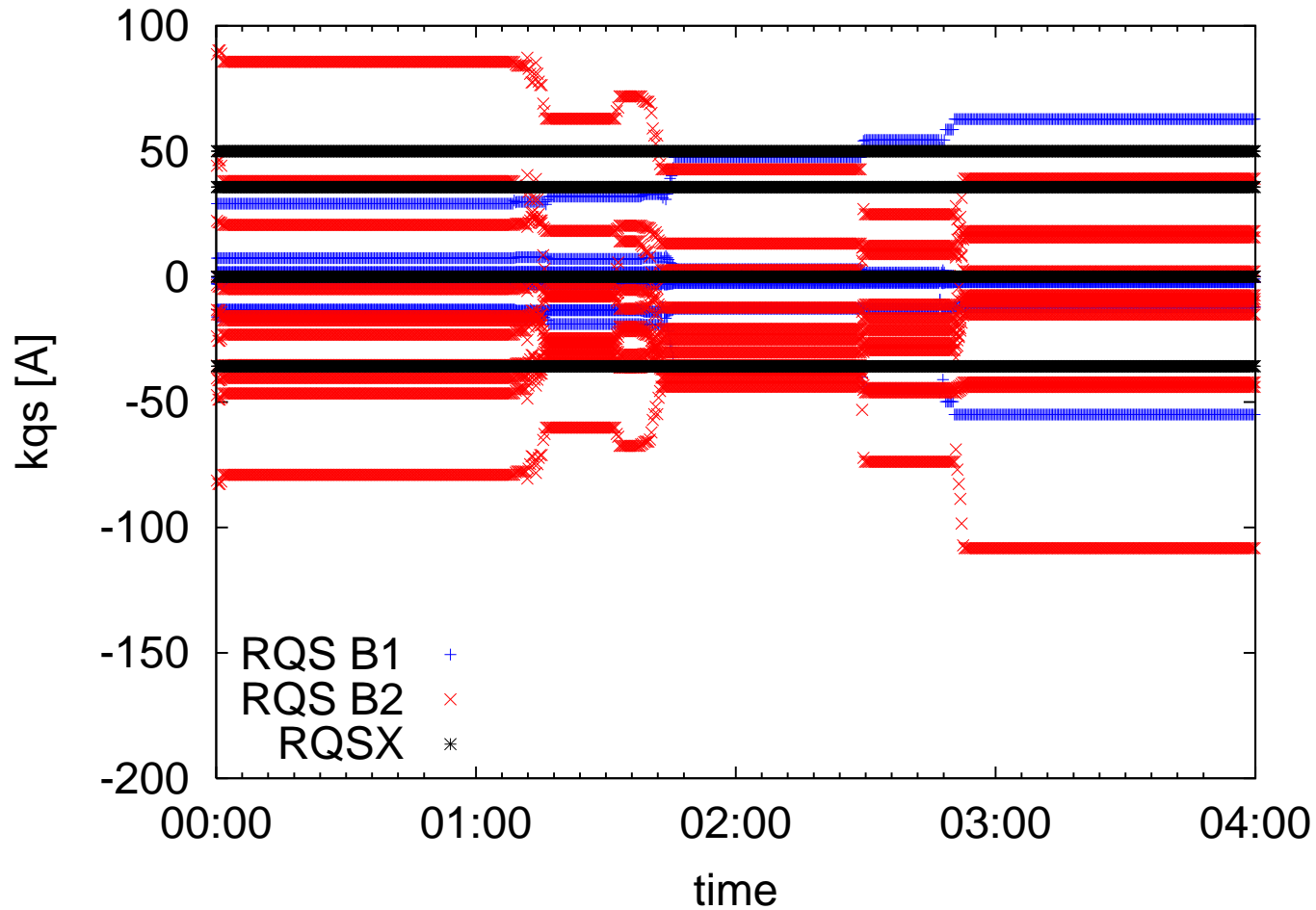
10% again!

Before IR1, IR5 & IR8 coupling corrections



Arc skew quads excited between -170 & 100
Amps.

After IR1, IR5 & IR8 coupling corrections



Arc skew quads excited between -110 & 60 Amps.

Summary & Outlook

- ★ 10% differences between 2010 and 2011
- ★ Local corrections worked very well between 1.5m & 3.5m
- ★ Global correction: 10% β -beating demonstrated at 1.5m!
- ★ Missing Beam2...
- ★ Please, drive all quads during squeeze
- ★ IR coupling correction worked but needs iteration
- ★ Coupling bump between 7m and 3.5m not healthy (S. Redaelli)