

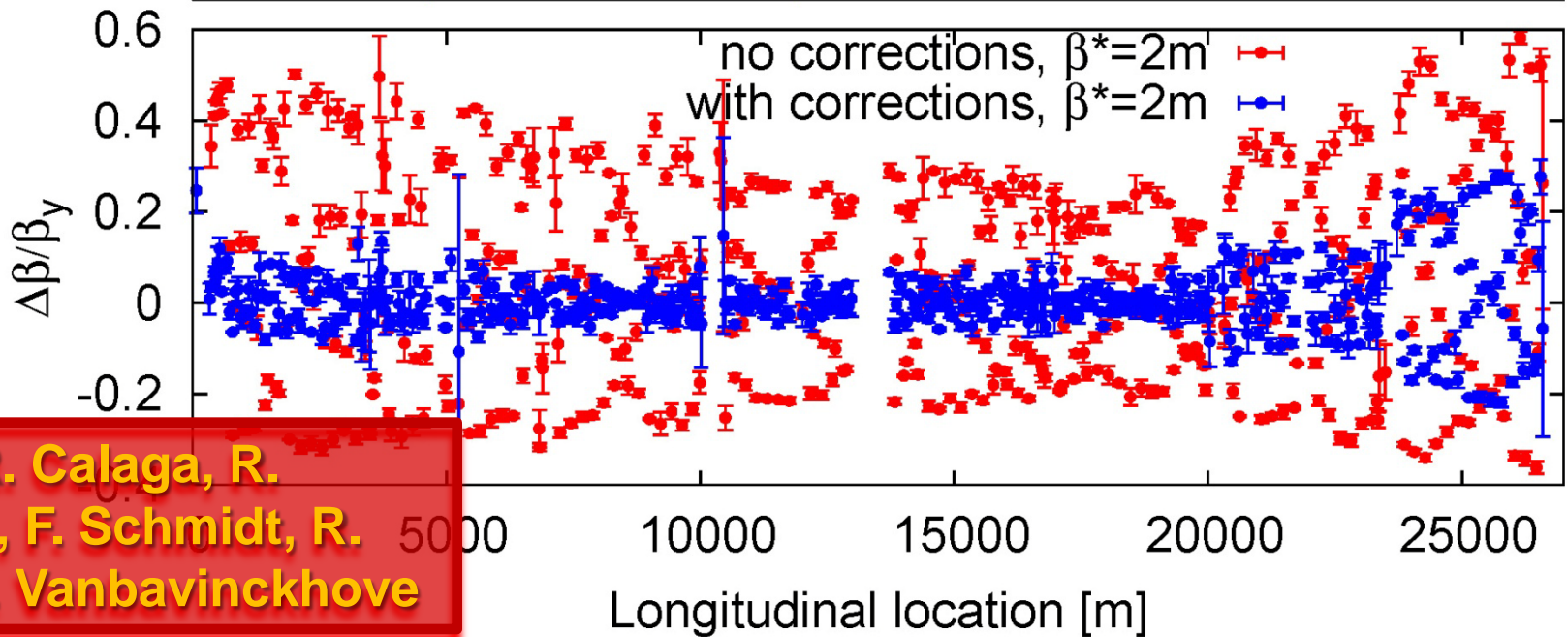
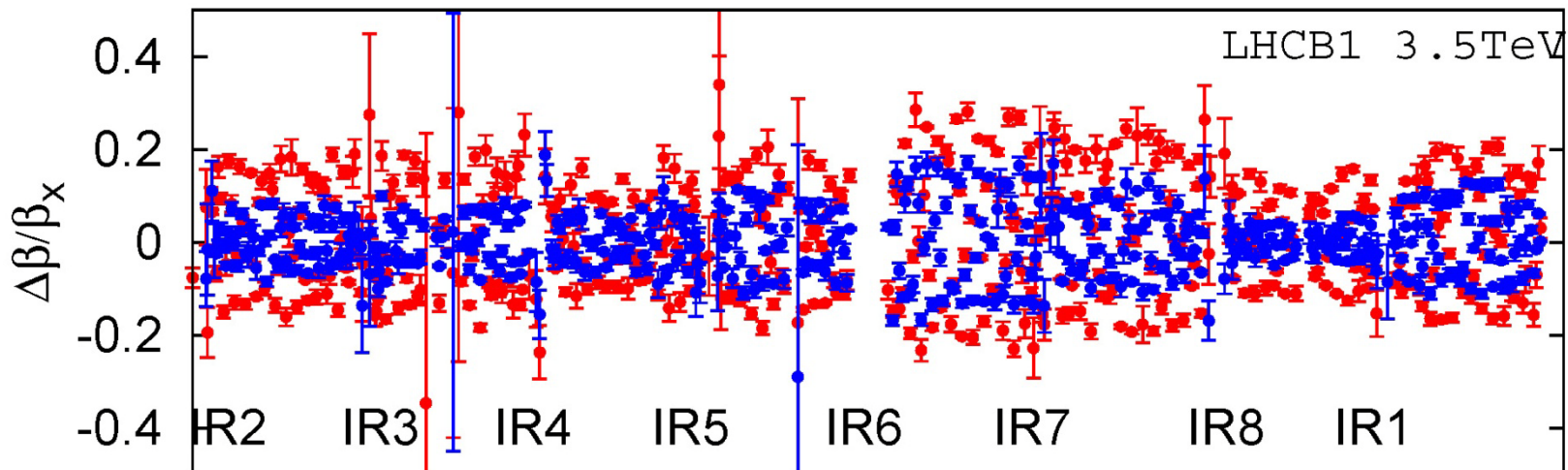
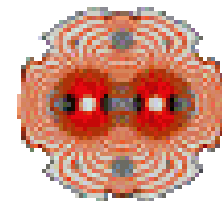
# HIGHLIGHTS OF LAST MONTHS OF LCU ACTIVITIES

A VERY EXCITING AND BUSY  
PERIOD

FROM PREPARATION (OPTICS,  
DATABASE, MODELS, SIMULATIONS)  
TO MEASUREMENTS (FINALLY!)

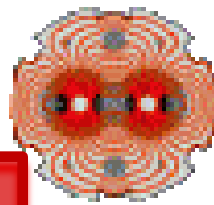
# LHC beam commissioning

## Optics measurement and correction

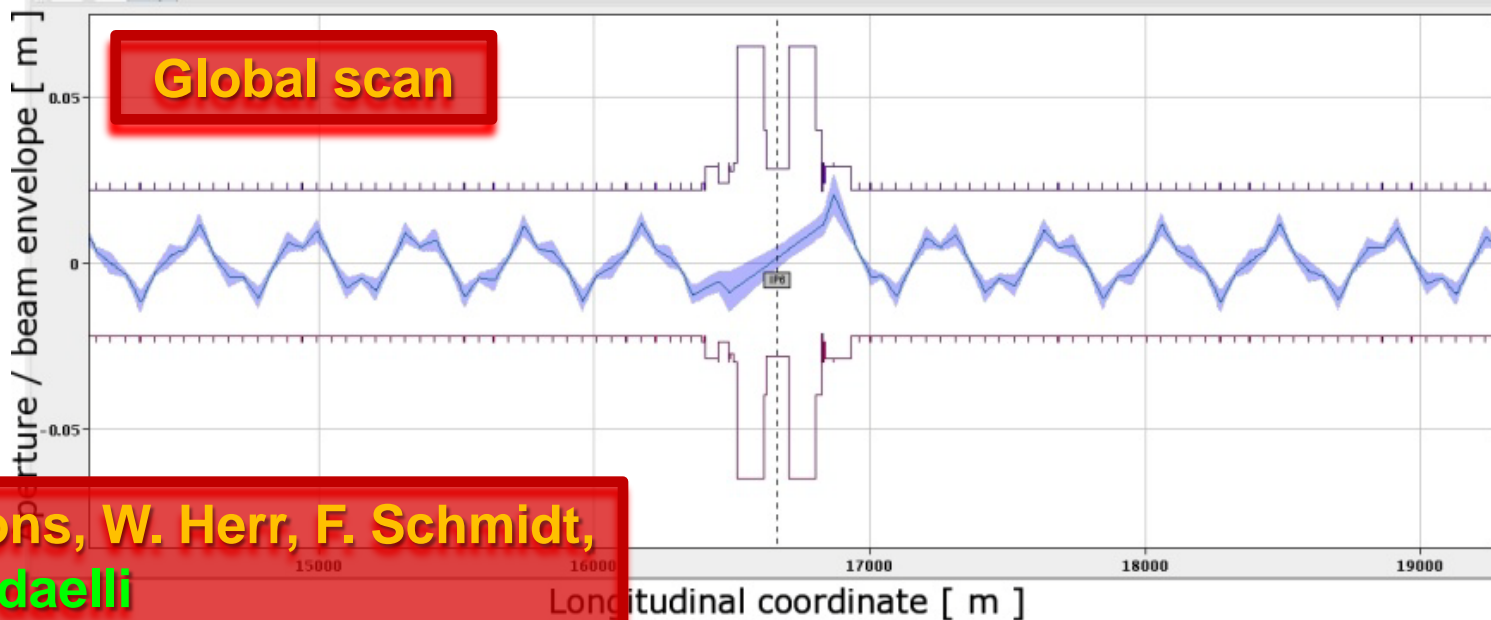
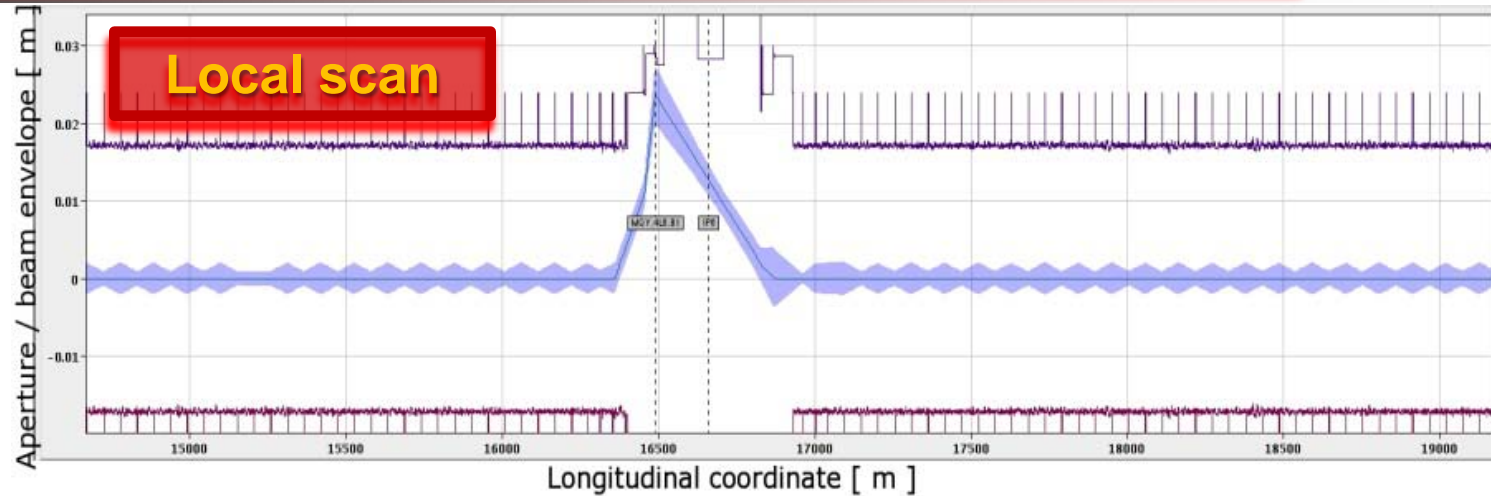


M. Aiba, R. Calaga, R. Miyamoto, F. Schmidt, R. Tomás, G. Vanbavinckhove

# LHC beam commissioning



## Aperture measurements and on-line model

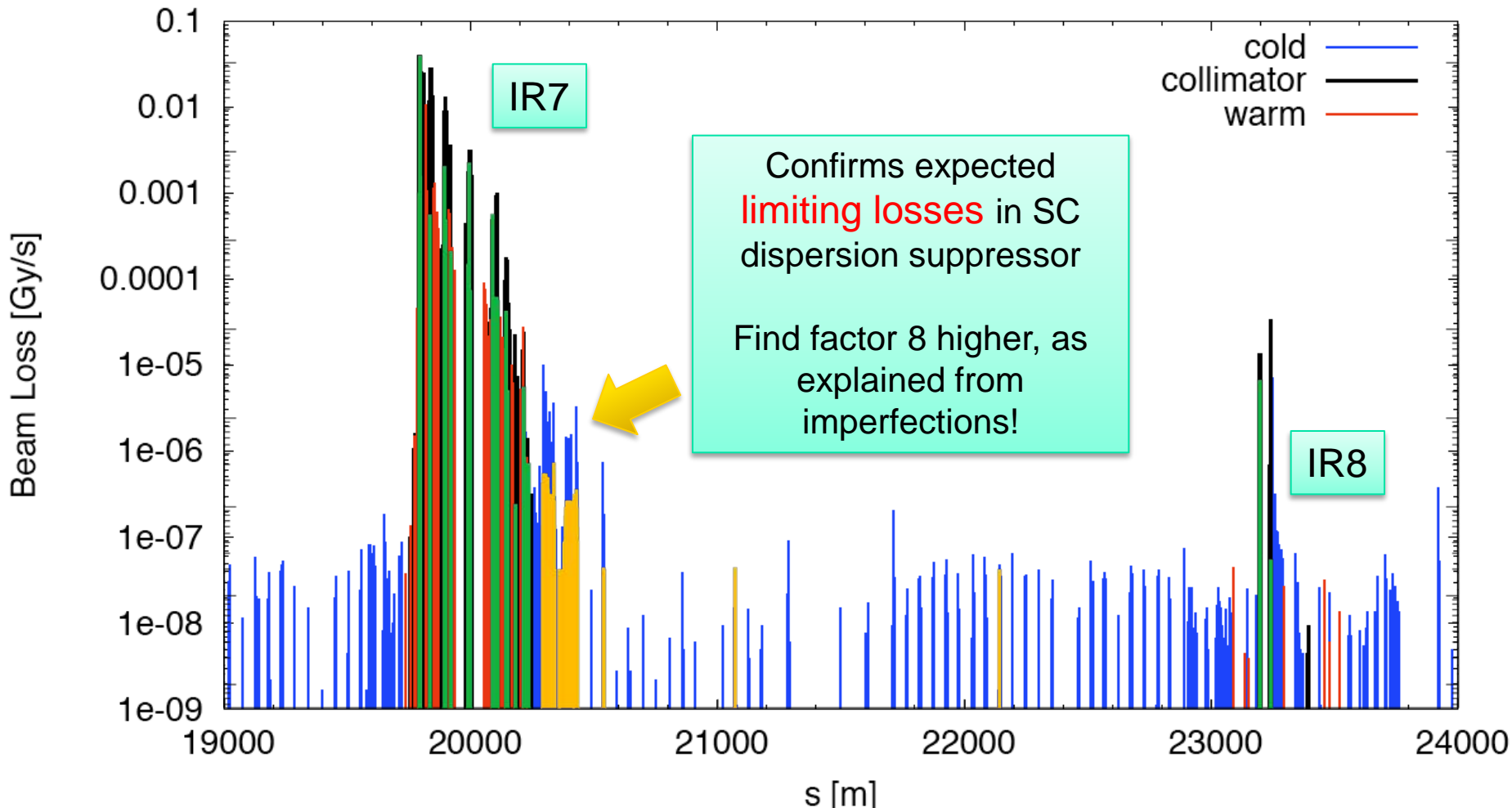
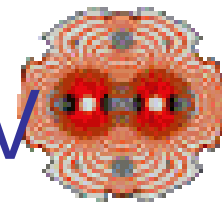


M. C. Alabau Pons, W. Herr, F. Schmidt,  
G. Müller, S. Redaelli

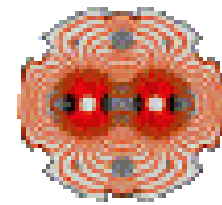
Longitudinal coordinate [ m ]

# Meas. & Sim. Cleaning at 3.5 TeV

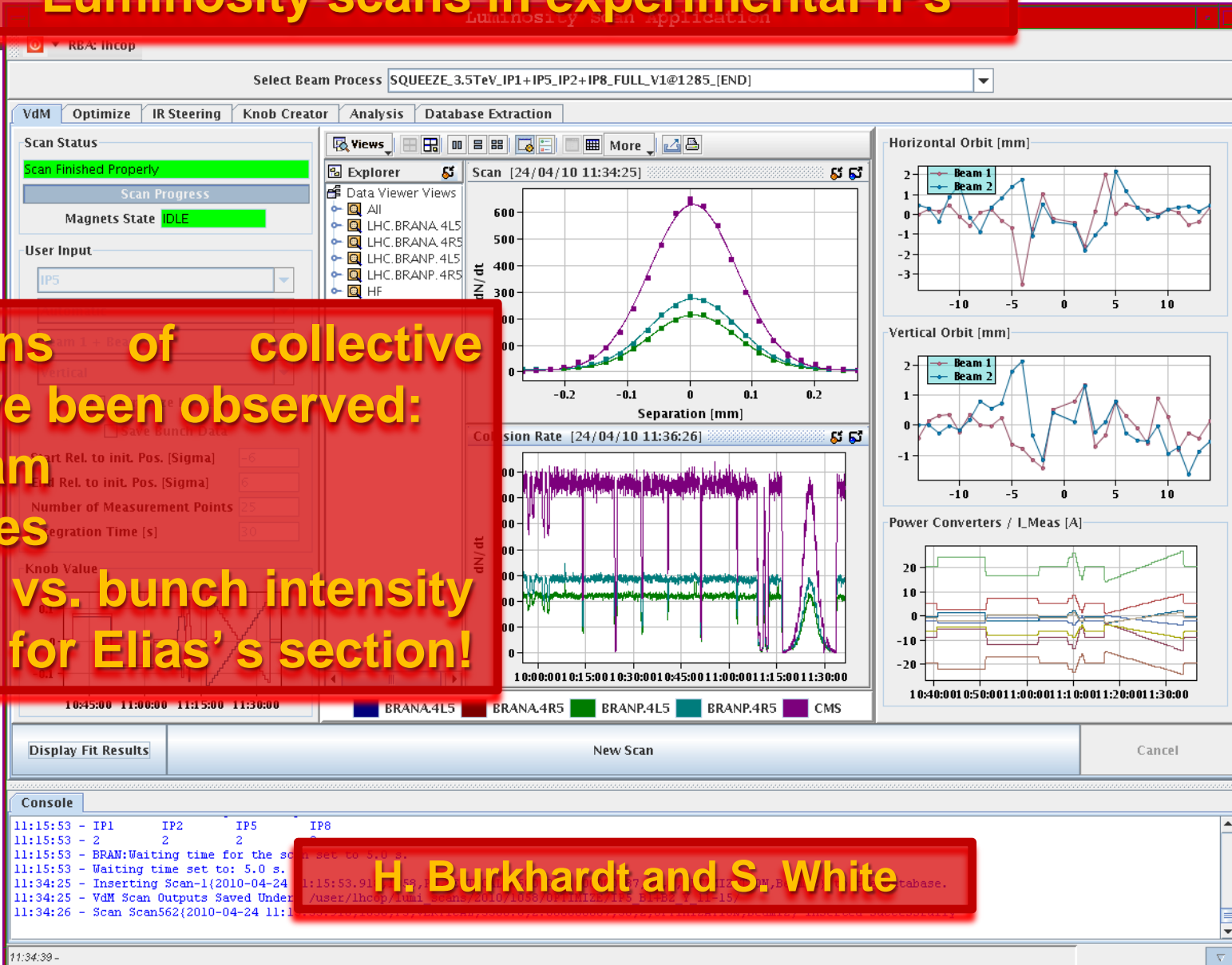
(beam1, vertical beam loss, intermediate settings)



# LHC beam commissioning



## Luminosity scans in experimental IPs



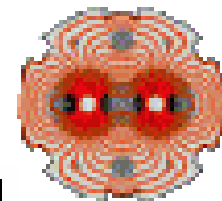
First signs of collective effects have been observed:

- beam-beam
- instabilities
- tune shift vs. bunch intensity

Good start for Elias's section!

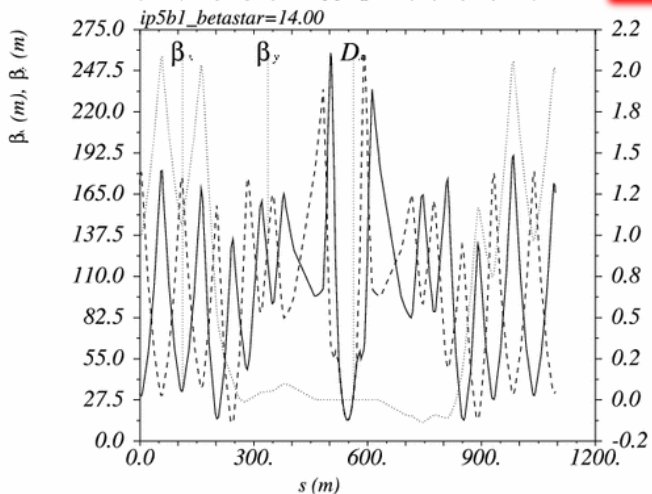
H. Burkhardt and S. White

# LHC upgrade: squeeze

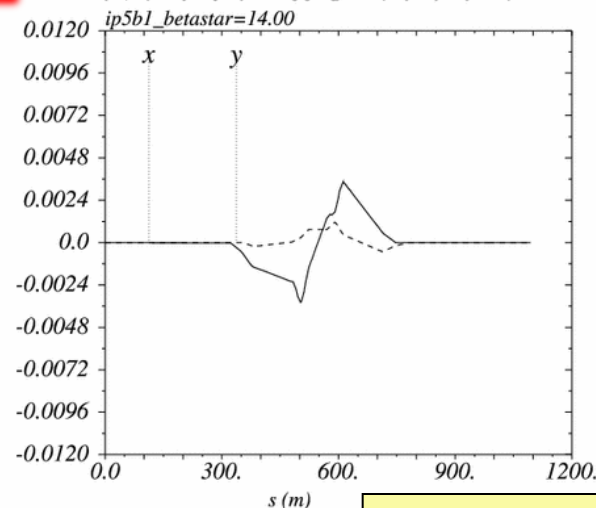


**S. Fartoukh**

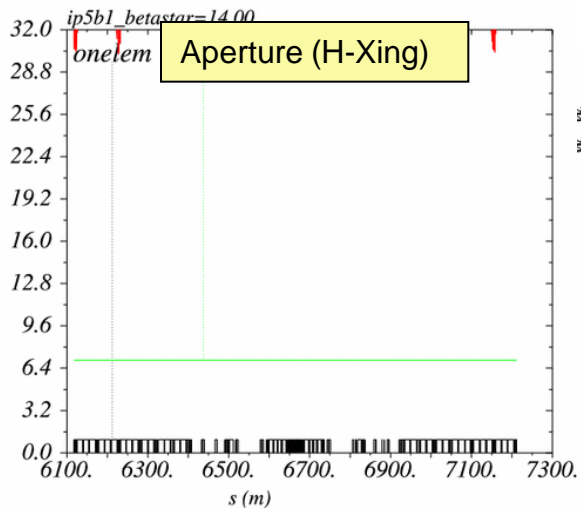
Optics



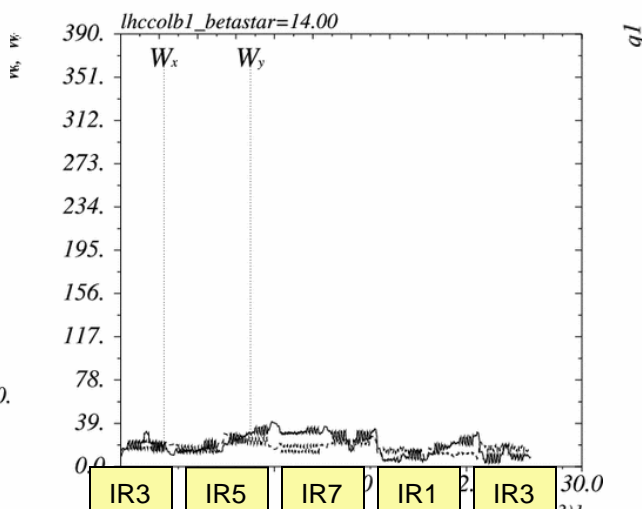
X-scheme(case of H-Xing)



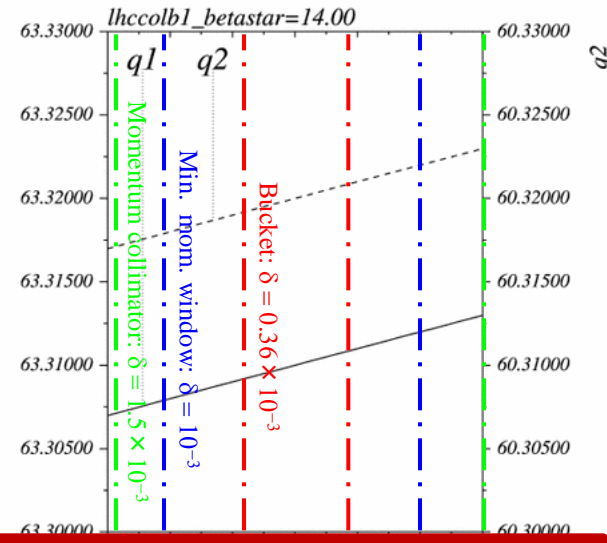
Aperture (H-Xing)



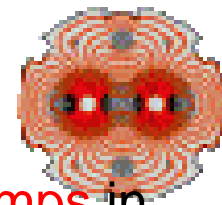
Off-momentum  $\beta$ -beating envelop



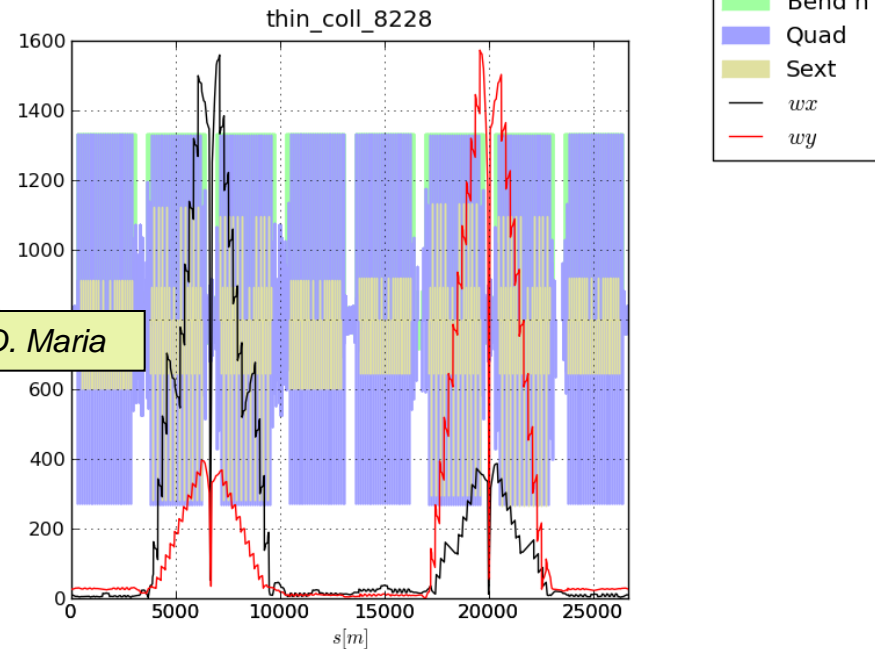
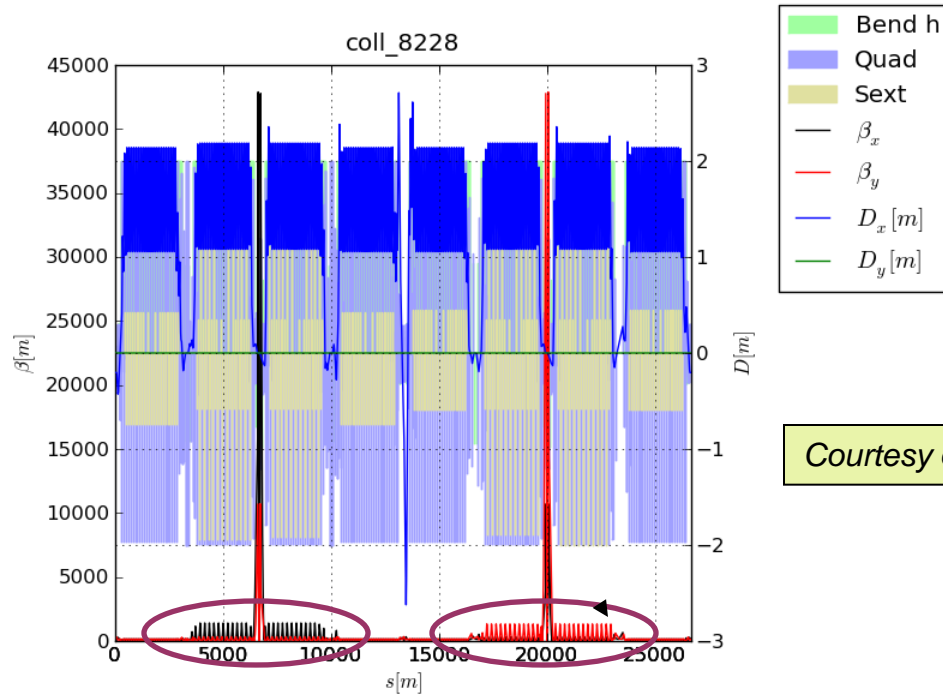
Tunes vs  $\delta$  ( $Q'=2$ )



# Latest optics scheme to reach $6E+34$ w/o crabs



→ Creating **beta-beating bumps** in the arcs to perform the squeeze (below  $\beta^*=60\text{cm}$ ) and remove any chromatic limit



Courtesy of R. D. Maria

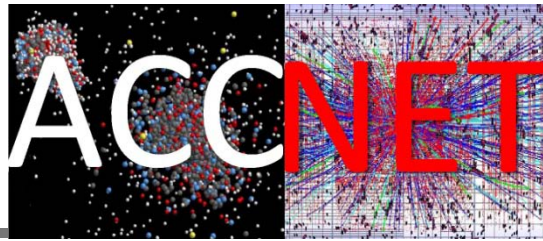
LHC collision optics

$\beta_{x/y}^* = 7.5 \text{ cm}/30 \text{ cm}$  at IP1

and

$\beta_{x/y}^* = 30 \text{ cm}/7.5 \text{ cm}$  at IP5

Chromatic Montague functions



## ***Accelerator Networks***

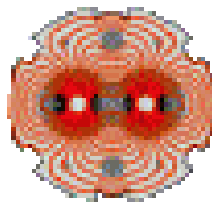
AccNet is coordinated by F. Zimmermann, W. Scandale and P. Spiller, together with E. Todesco (EuroLumi), J.-M. De Conto, M. Grecki, W. Weingarten (RFTech)

### ***1<sup>st</sup> year of AccNet: 6 mini-workshops and events:***

LHC-CC09 (LHC crab cavities, Sept.'09), AEC'09 (anti-e-cloud coatings, Oct.'09), CC'09 (crystal collimation, Nov.'09), PPA'09 (proton driven plasma acceleration, Dec.'09), Physics for Health in Europe (co-sponsored by AccNet, Feb.'09), RFTech annual meeting (March'09)

***highlights:*** initiated **LHC crab-cavity program**; novel **anti e-cloud coating techniques**; "LPA" scheme for LHC luminosity upgrade; **LHC energy upgrade**; scope expanded to **medical accelerators** and **plasma acceleration**, exchange of **13 expert visitors, two theses, 6 conference papers, 2 journal articles**





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**CONGRATULATION TO ALL  
OF YOU FOR THE GREAT  
ACHIEVEMENTS!**