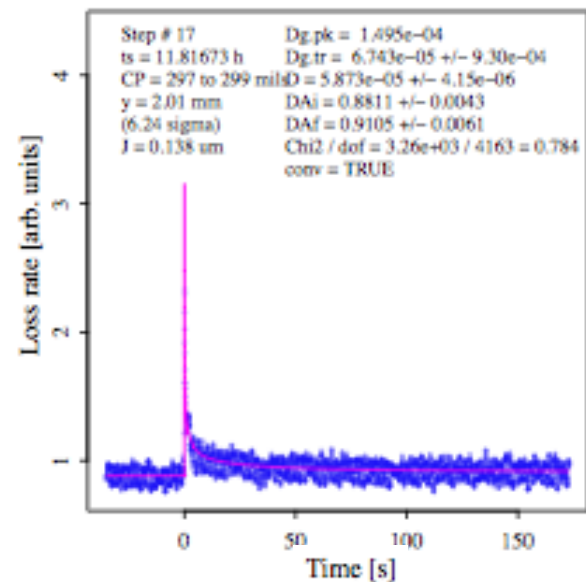


Beam Scraping, Diffusion and Repopulation MD

**G. Valentino, R. W. Assmann, R. Bruce, F. Burkart,
M. Cauchi, D. Deboy, L. Lari, S. Redaelli,
B. Salvachua, G. Stancari, D. Wollmann**

- Time evolution of beam losses in collimator scan gives information on:
 - Halo diffusion, halo population, emittance growth, lifetime, ...
- Measurements will profit from the new 12.5 Hz BLM data for greater resolution.



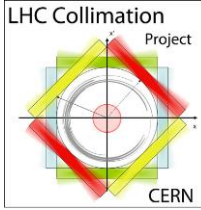
Courtesy: G. Stancari

- Diffusion model developed by G. Stancari for Tevatron data.
- Match loss spikes before, during and after collimator steps, both inward and outward.
- Diffusion coefficient used to predict spike height.
- Determination of BLM-to-intensity calibration factors with applications to lifetime and collimation system performance (F. Burkart)

- Results will be extrapolated to 7 TeV to predict possible intensity limitations.



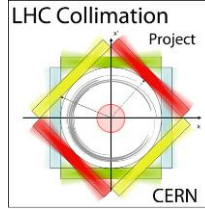
MD Requirements



- 450 GeV (3 hours):- 1 – 3 fills
- 4 TeV (3 hours incl. ramps):- 1 fill
- Emittance: $2\mu\text{m} - 4\mu\text{m}$, injection optics
- Both beams, 1 nominal bunch per beam
- BLMs and collimator movements masked
- **Collimators retracted beyond physical aperture at 15 sigmas**
 - Reduce interference from other collimators during scraping



MD Programme



- Studies to be performed at 450 GeV and 4 TeV:
 - (a) Retract all collimators except TCP IR7 as far as possible (ideally **15 sigmas**).
 - (b) Move IR7 TCP in one beam in steps of $10\ \mu\text{m}$ – $50\ \mu\text{m}$ every 10 seconds (or until losses decay).
 - (c) Periodically measure emittance.
 - (d) Put IR7 TCP back to the starting position, and wait for losses to increase (halo repopulation).
 - (e) Repeat for other IR7 TCPs as long as there is time.
 - (f) Dump beams with a further scraping to estimate diffusion in the core.
- MD slot shift request:
 - MD slot currently foreseen for 24th June from 00:00 to 06:00.
 - Swap with slot on 19th – 21st or 25th June would be appreciated due to unavailability of some team members.