

1<sup>st</sup> SuperB Collaboration Meeting  
Computing: FullSim Parallel session Sep. 14<sup>th</sup> 2011

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# FullSim Production Report

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# Outline

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- **Latest Full-Simulation Production:**
  - BRN code validation
  - New Fwd-EMC geometries
  - Background frames production for FastSim
  - Touschek simulation

# BRN validation

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- **Migration to a Packaged version of Bruno code  $\Rightarrow$  BRN**
- **BRN code validation:**
  - Motivation: to verify that the simulation output is equivalent to the legacy bruno code
  - The method: compare new code output with previous productions using old code (Elba production)
  - Generate Rad-BhaBha events with same configuration for Elba
    - Machine: SF10 V12
    - Geometry: Geometry\_CIPE\_V00-00-02
  - Production size is 10% of latest Elba Rad-BhaBha production: ~3000 bunch crossings

# Fwd-EMC geometries

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- **Request from Stefano Germani to test different options for Fwd-EMC device**
  - Nominal configuration uses LYSO (Geometry\_CIPE\_V00-00-02)
  - New geometries to be tested:
    - CSI: Csi with VPT readout (Geometry\_CIPE\_CSI)
    - BGO: Bgo with PMT readout (Geometry\_CIPE\_BGO)
- **Production:**
  - Geometry\_CIPE\_CSI ~ 7.4k bunch crossings
  - Geometry\_CIPE\_BGO ~ 10k bunch crossings

# Background Frames for FastSim

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## ■ Request from Matteo Rama

- Wants to have the background frames for fastsim (bg-frames) as updated as possible
- Every scheduled FullSim production of machine backgrounds should produce as well the bg-frames

## ■ Production (Geometry\_CIPE\_V00-00-02):

- Test and validation:
  - ~6k bunch crossings of Rad-BhaBha with  
⇒ equivalent to 30 micro secs
  - Status: being analysed
- Actual request size: 1000 micro secs ⇒ ~1M bunch crossings

## ■ Some issues:

- Jobs take too long (1.3 hours per event) due to detailed final focus model ( $\pm 16\text{m}$  from IP)
- Maybe it will be enough to produce bg-frames with a shorter final focus model

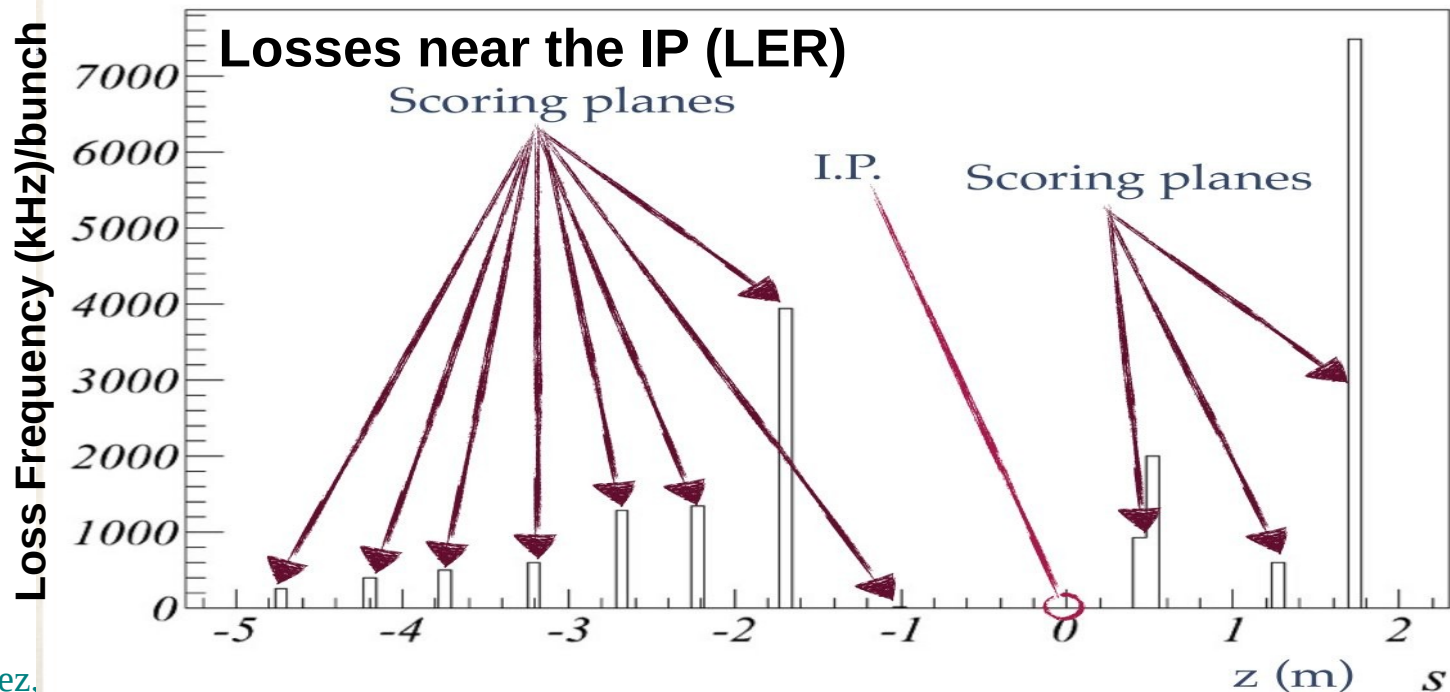
# Touschek Background: Strategy

## ■ Primaries for BRN: STAR code (Manuela Boscolo)

- Simulate both Touschek and the beam gas scattering along the beam line
- Transport the scattered particles along the lattice
- Detect the collisions of these particles with the beam pipes (scoring planes)

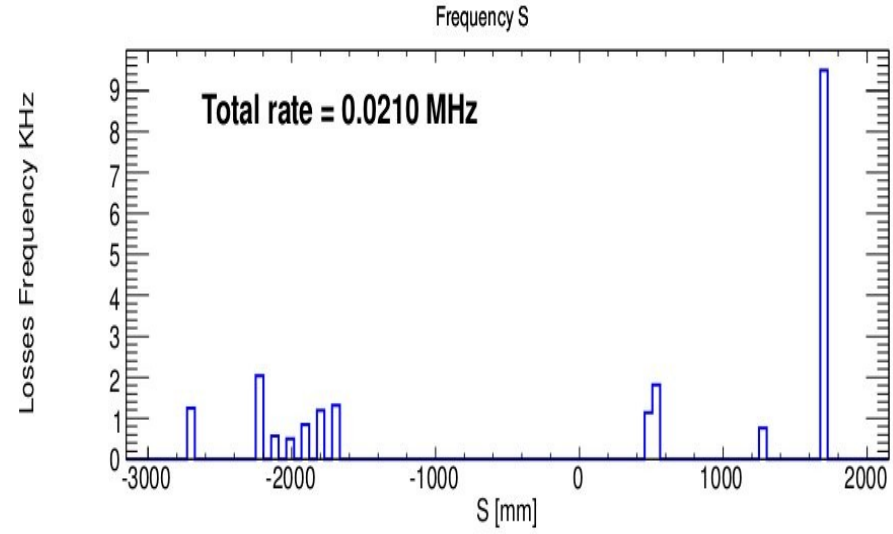
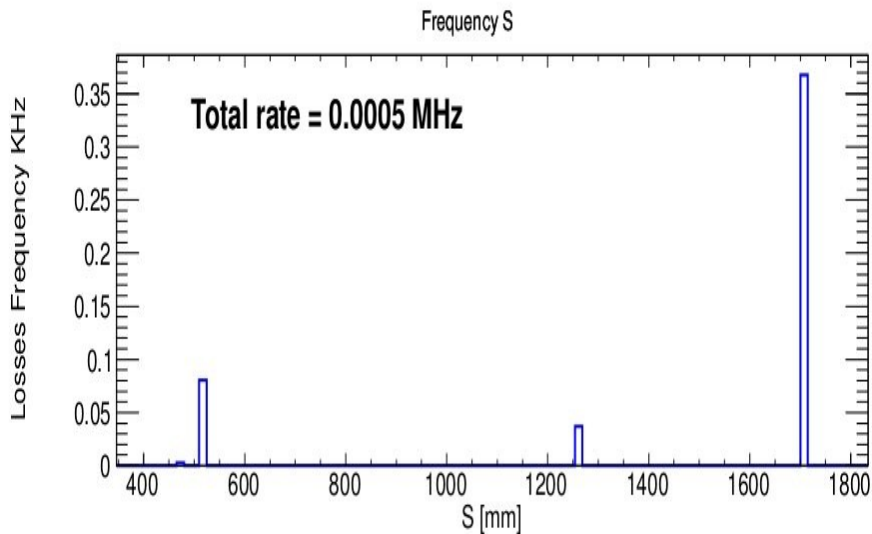
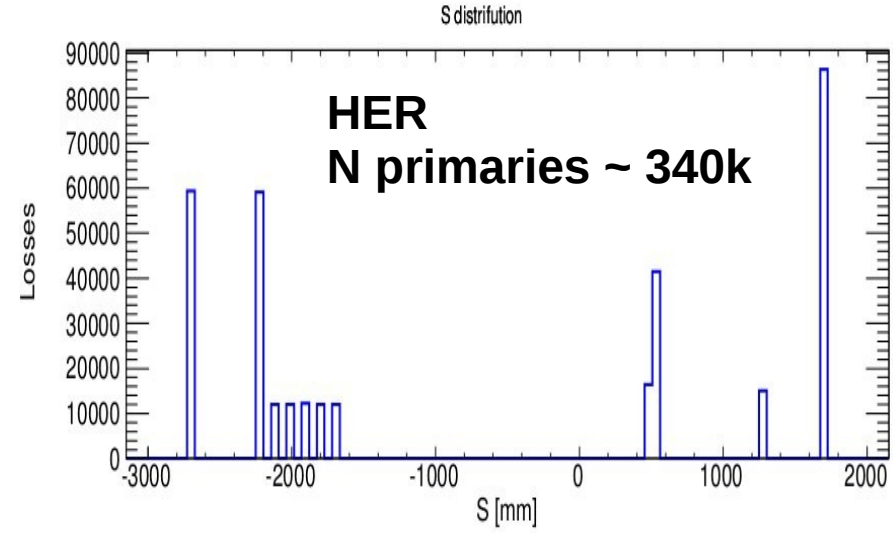
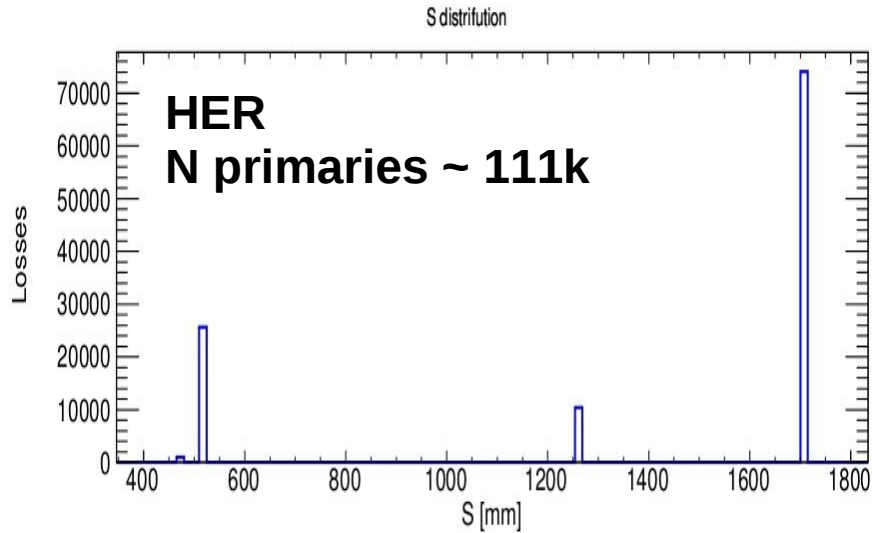
## ■ Typical output:

0.445558E-01	-0.550303E-02	-0.126830E-05	0.376408E-06	1.71000	-0.239831E-01	0.818628	1
0.456014E-01	-0.570537E-02	-0.280276E-04	0.113856E-04	1.71000	-0.252154E-01	0.755761	1
0.474620E-01	-0.592261E-02	-0.210435E-04	0.873927E-05	1.71000	-0.249482E-01	0.778852	1
0.432248E-01	-0.531700E-02	-0.179759E-04	0.663319E-05	1.71000	-0.236050E-01	0.997186	1
$x$ (m)	$\frac{dx}{ds}$ (rad)	$y$ (m)	$\frac{dy}{ds}$ (rad)	$s$ (m)	$\frac{\Delta E}{E}$	$f$ (KHz)	#turn



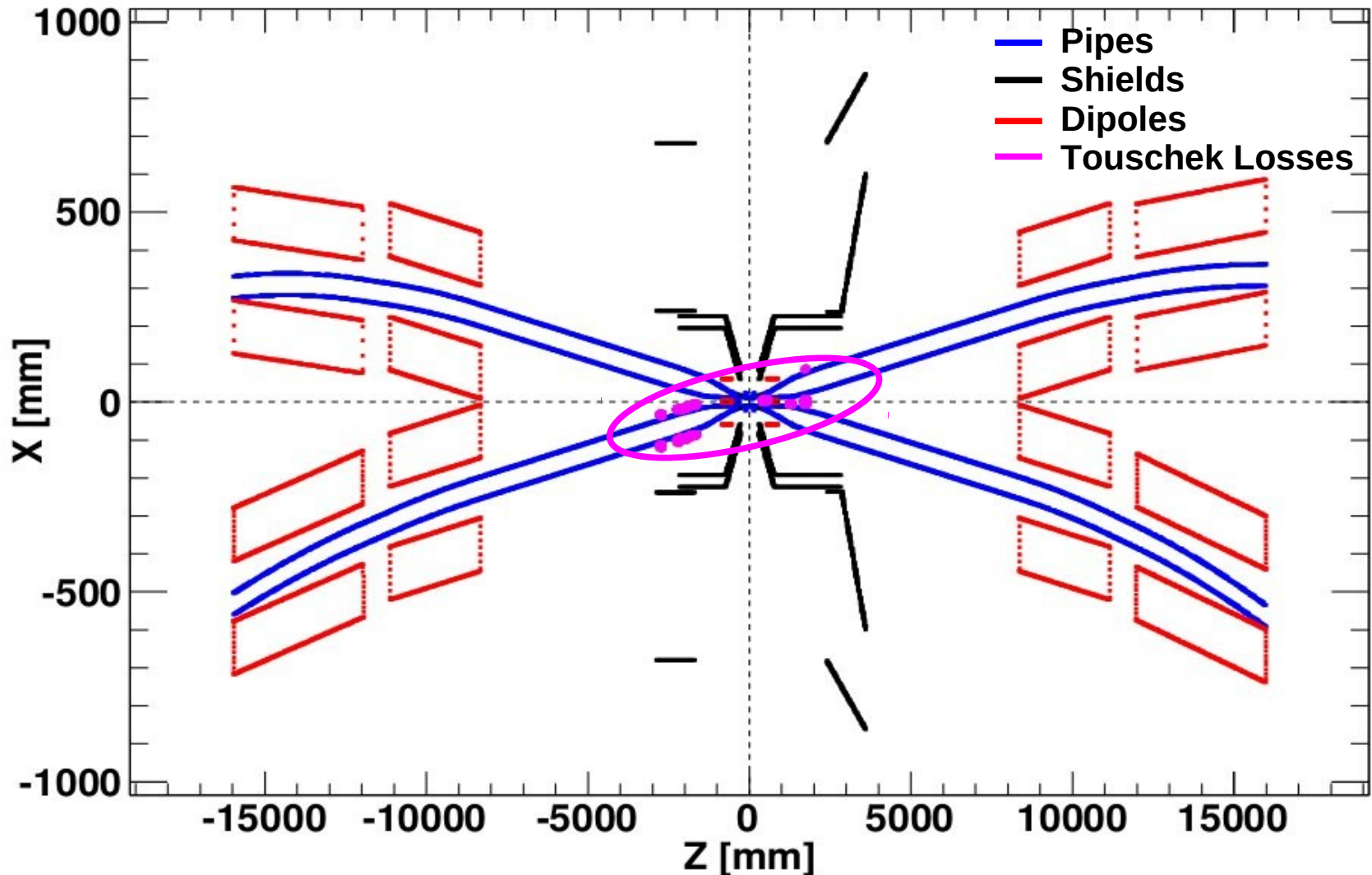
# Touschek Background: Samples (I)

## Losses near the IP



# Touschek Background: Samples (II)

Losses near the IP (LER)



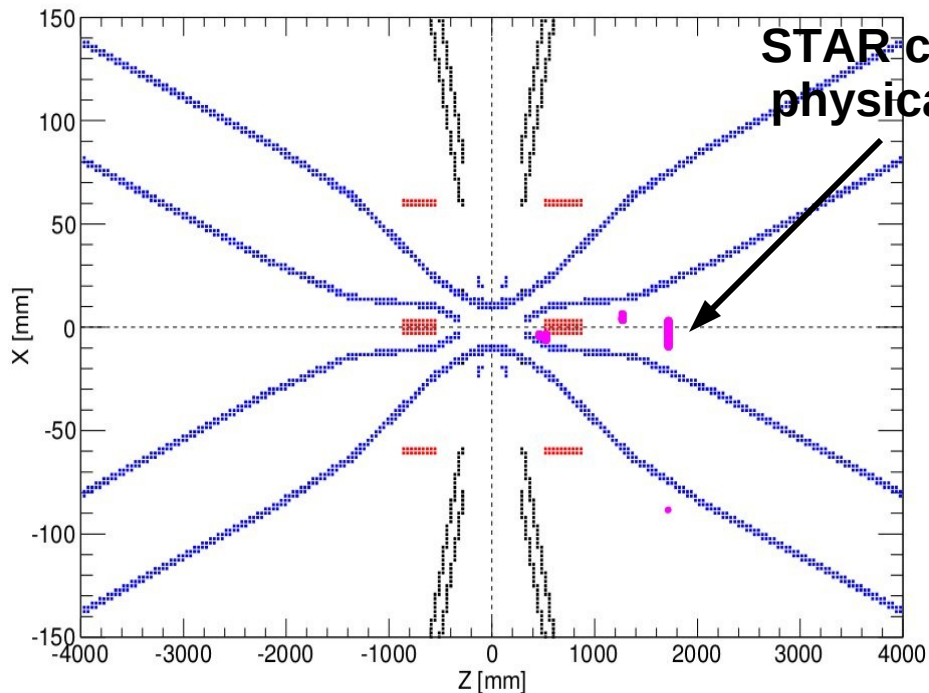


# Touschek Background: Samples (III)

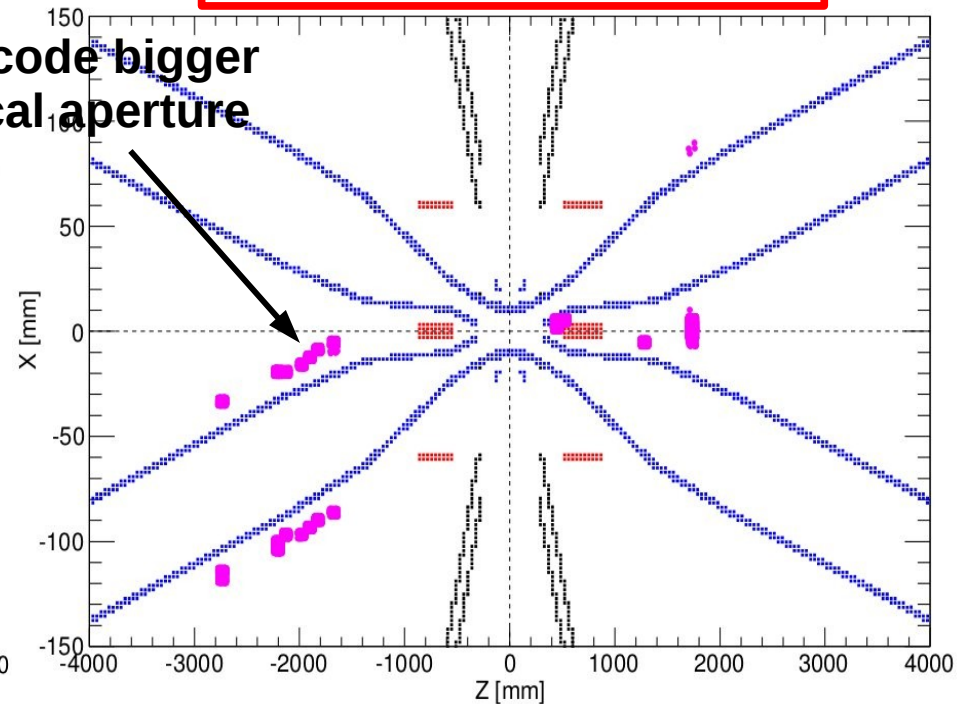
- Touschek Losses are mainly located in the downstream direction of the beam pipe
- One issue:
  - STAR code uses a physical aperture bigger than BRN: pipe radius 4cm (STAR) instead of 2.5cm (BRN)
  - Touschek background rates are expected to be underestimated with the current samples

- Pipes
- Shields
- Dipoles
- Touschek Losses

Losses near the IP (HER)



Losses near the IP (LER)



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Backup