BIB efforts at SLAC

Mirella Vassilev, Dimitris Ntounis,
Caterina Vernieri

November 21st, 2025

SLAC NATIONAL ACCELERATOR LABORATORY

Stanford University | U.S. DEPARTMENT OF ENERGY

Our Framework:

github repo

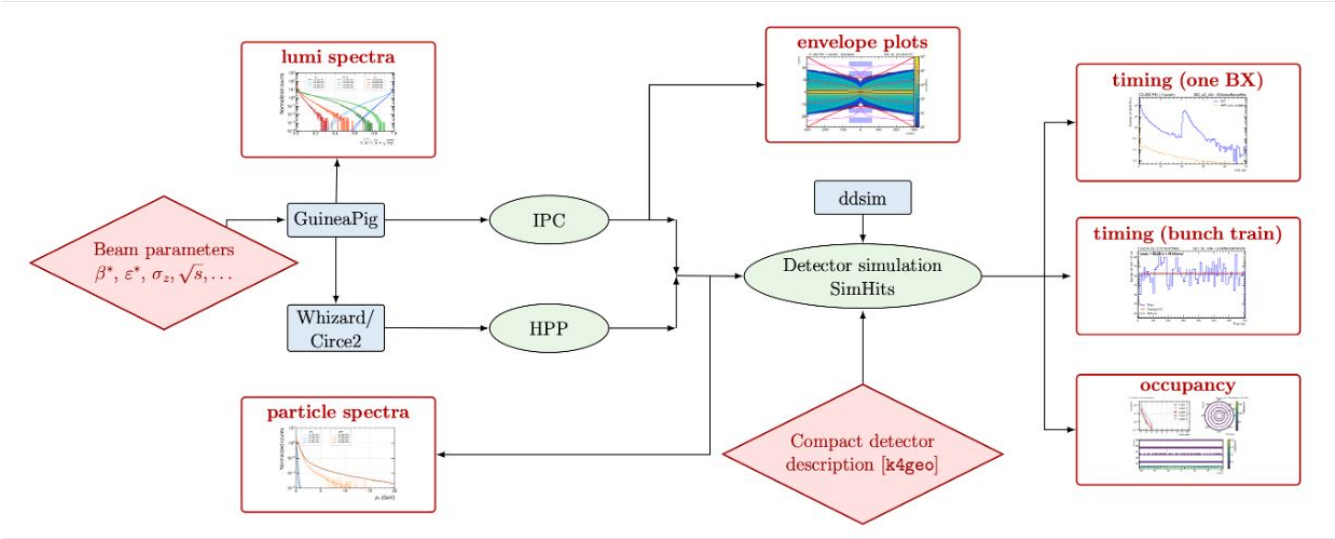
Beam-Beam Backgrounds for the Cool Copper Collider

DOI 10.5281/zenodo.17518429

Companion codebase for the paper **Beam-Beam Backgrounds for the Cool Copper Collider** by Dimitrios Ntounis, Caterina Vernieri, Lindsey Gray, Elias Mettner, Tim Barklow, Laith Gordon, and Emilio A. Nanni.
External links: arXiv | Journal submission (pending)

End-to-end pipeline for detector-level studies of beam-beam backgrounds , already demonstrated for C^3: arXiv:2511.01075

- IPC and HPP studies, driven by GuineaPig and Whizard/Circe2
- Detector SimHits generated with ddsim using detector geometries from k4geo
- Downstream analysis for timing/ occupancy/ per sub-detector summaries

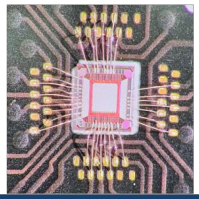


Modular framework that can accommodate different collider parameters and detector concepts

Our Interests:

Join the effort and exercise framework to study BIB at FCC-ee!

Group interest, working on R&D for future detectors, quantify timing and occupancy to better inform/motivate detector requirements



JINST 19 (2024) 04, C04033

Expertise at SLAC on BIB and framework. Implementing FCC-ee parameters in framework, results to come shortly.

- Grid parameters taken from card here and updated with beam parameters from FSR: acc.dat card
- No special treatment of detector magnetic field, not relevant for C^3

Inputs to GuineaPig					
	Units	CDR	MTR	FSR	GHC
sigma_x	nm	6360	8837.42	8837.42	*8160.88*
sigma_y	nm	28.3	36.47	38.34	*35.89*
sigma_z	um	12100	15500.00	15200.00	*15882.33*
beta_x	mm	150	110.00	110.00	*90*
beta_y	mm	0.8	0.70	0.70	*0.7*
Bunch density	10^10	17	21.40	21.80	*20.20*

Jan Presentation

```
$ACCELERATOR:: FCCee_Z
{energy=45.6;
particles=21.80;
beta_x=90;
beta_y=0.7;
dist_z.1=0;dist_z.2=0;
sigma_x=8837.42;
sigma_y=38.34;
sigma_z=15200;
offset_x=0.0;
offset_y=0.0;
n_b=1;
f_rep=1;
angle_x=-0.015;
charge_sign=-1;}

$PARAMETERS:: FCCee_Z
{
n_x=64*25 ;
n_y=64*10 ;
n_z=61 ;
n_t=10 ;
cut_x=150*sigma_x.1;
cut_y=60.0*sigma_y.1;
cut_z=3.0*sigma_z.1 ;
```