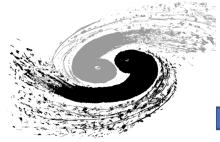


Status of MDI Part of Ref-TDR of CEPC Detector

Haoyu SHI

2024

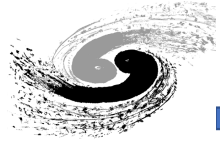
2024.2.27



LumiCal



- First version of detector design finished
 - Moving from G3 to CAD, then CEPCSW
 - No electronics yet
- Students from NJU could help on all aspects
 - Migration of MDI&Lumi Geometry/Algorithms
 - Study on performance & backgrounds of the LumiCal
 - Optimization of the detector design
 - Particle telescope / Experiments



Beam Induced Backgrounds



- Current Status towards First Pre. Version(Based on CEPCSoft):

Background	Mode	Generation	Tracking	Noise Estimation	Rad. Da. Esti.	Rad. Env. Esti.
Synchrotron Radiation	Higgs	To do	To do	To do	-	-
	Z	To do	To do	To do	-	-
Beamstrahlung/Pair Production	Higgs	Done	-	Doing with VTX	Doing with VTX	-
	Z	Doing	-	Doing with VTX	Doing with VTX	-
Beam-Thermal Photon	Higgs	Done	Done	Doing with VTX	Doing with VTX	-
	Z	Done	Done	Doing with VTX	Doing with VTX	-
Beam-Gas Bremsstrahlung	Higgs	Done	Done	Doing with VTX	Doing with VTX	-
	Z	Done	Done	Doing with VTX	Doing with VTX	-
Beam-Gas Coulomb	Higgs	Done	Done	Doing with VTX	Doing with VTX	-
	Z	Done	Done	Doing with VTX	Doing with VTX	-
Radiative Bhabha	Higgs	-	-	-	-	-
	Z	-	-	-	-	-
Touschek	Higgs	-	-	-	-	-
	Z	Doing	To do	To do	To do	-

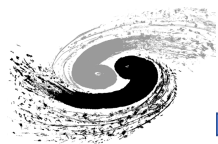


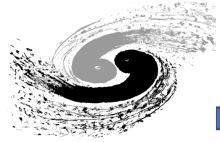
Table updated on 1st Vertex Layer



- Still Preliminary, without safety factor. Assuming 1e7 s running per yr.

	Higgs	Z
BXRate(Hz)	1.34e6	3.93e7

Background	Hit Density($cm^{-2} \cdot s^{-1}$)		TID(Mrad $\cdot yr^{-1}$)		1 MeV equivalent neutron fluence ($n_{eq} \times 10^{12} \cdot cm^{-2} \cdot yr^{-1}$)	
	Higgs	Z	Higgs	Z	Higgs	Z
Pair production	2.95e5	9.83e6	3.2	3.5	44.23	0.11
Beam Loss						
Total						



Next Step



- Action items:
 - Discussion on mechanical drawings with accelerator people, this Thursday afternoon
 - Updating the BG Table using CEPCSoft, with help from detector designers
 - Migrate to CEPCSW:
 - Training on geometry implementation of CEPCSW
 - Algorithms in CEPCSW to get hit rate/occupancy