

MDI task list for GLD group

Priority has been determined by the ILC-WG4 parameters which will be chosen at the SNOWMASS. The ILC-WG4 has a charge of designing the beam delivery system; i.e. from the end of LINAC through the beam dump including the interaction region(IR). The tasks are listed in the priority order as follows.

I . First priority :

I-1. Crossing angle: what is the best angle; i.e. 0, 2 and 20mrad ?

Following issues should be investigated with the above three angle cases.

1-1) stau-pair production, (ee)tau tau background rejection by mini-veto angle

1-2) comparison of backgrounds for 2/20mrad crossing, three detectors (SiD, LCD, GLD)
background: synchrotron radiations, pairs, neutrons, Xrays

1-3) choice of final doublet; i.e. super, permanent (hybrid) and iron

1-4) option: geometry package of e-e- and gamma gamma colliders with laser cavities
Does GLD accept the option of gamma-gamma collisions?

I-2. Determination of L^* ; distance of the front face of final quadrupole magnet (FQ) from IP

2-1) How to verify 4.5m in comparison with 3.5m, if $L^*=4.5m$ is chosen at GLD ?
in terms of backgrounds, support of final-Q

2-2) Stabilization of the FQ

- how to support the FQ; e.g. on the iron wall, support tube, optical anchor ?

I-3. Simulation of background from the BDS based on the LCBDS(BDSIM) and Jupiter

3-1) LCBDS manual for users and homepage, cross-check with the UK-version

3-2) Tolerable level of each background (muons, radiation, pairs etc.)

3-2) muons, synchrotron radiation v.s. collimation depth for CAL, VTX

3-3) backscattered background (photons, e+/-, neutrons) from the extraction line with the beam dump

II Next priority

II-1. Beam parameter choice; are all the parameter sets acceptable ?

1-1) Preparation of 4 parameter sets to CAIN of beam-beam simulation at IP

i.e. nominal, Low Q(half beam intensity), Large Y(large vertical beam size), Low P (less beam power) and High luminosity, where the former 4 sets has the same luminosity.

- Separation between bunch crossings: 154 to 462 nsec
- Average beamstrahlung energy loss: 1.8 to 7% (500 GeV) and 4.4 to 18% (1000 GeV)
- Incoherent e+e- pairs per crossing: 0.8 to 6.4 10^5 (500 GeV) and 1.5 to 13.6 10^5 (1000 GeV)
- Luminosity: 2 to 5 10^{34} cm⁻² s⁻¹ (500 GeV) and 3 to 8 10^{34} cm⁻² s⁻¹ (1000 GeV)

1-2) background simulation with the above 4 sets

- incoherent pair
- backscattered from the extraction line