Meeting of GWP03 devoted to discussion of requirements of upstream polarimeter

November 29, 2007

Participants : Peter Schuler, Jenny List, Mike Woods, Ken Moffeit, Andrei Seryi, Yuri Nosochkov, Mark Woodley, Deepa Angal-Kalinin
(any missing names?)

Meeting page: http://ilcagenda.linearcollider.org/conferenceDisplay.py?confId=2399

Polarimeter design and requirements were presented by Peter Schuler (schuler@mail.desy.de)

Issues identified:

This is a complicated system that requires integration of polarimetry measurement requirements and of the accelerator design. Some of the issues may have been overlooked in the RDR design or created, when functionalities of polarimeter, laser wire detector from upstream emittance measurement section and off energy detection chicane were combined.

Peter described the advantage to run the chicane at fixed field over energy range of 45 GeV – 500 GeV. The advantage of getting more channels is lost at scaled fields.

The complex issue of limited space for the laser wire detector at 500 GeV/beam, the possible complexities in the machine protection collimator design (which is 3m long with 2 mm full aperture) to change at different energies for +/-10% energy bandwidth and vacuum chamber design to accommodate the collimator design need further studies.

Immediate action items:

1) Study requirements and design of the MPS energy collimator located in the polarimeter chicane.

Responsible: Collimation GWP leaders: Nigel Watson (Nigel.Watson@rl.ac.uk)
Nikolai Mokhov (mokhov@fnal.gov)

2) Look at vacuum chamber design of the polarimeter, and identify if there are any particular design or integration challenges for fixed field or scaled field version. Also, to look if there is any difference from the design costed for the RDR and what is that difference.

Responsible: Vacuum GWP leaders: Oleg Malyshev (o.b.malyshev@dl.ac.uk)
Yusuke Suetsugu (yusuke.suetsugu@kek.jp)

3) Ask Instrumentation group and the laser wire experts to study if the laser wire photon detector will actually work or even survive under the flux of synchrotron radiation photons which comes from upstream magnets. If photon detector does not work, one may have to use detection of electrons.

Responsible: Instrumentation GWP leaders: Philip Burrows (p.burrows1@physics.ox.ac.uk)
Mike Woods (mwoods@slac.stanford.edu)
Laser wire team: Grahame Blair (blair@pp.rhul.ac.uk)

4) Consider a version of design with scaled field and three fixed field ranges, with a fixed dispersion depending on the range. Let's say 20mm in the baseline parameter range of 100-250GeV/beam, 15mm in 250-500GeV/beam, 50mm in 45-100GeV/beam range.

Responsible: Acc.&phys requirement GWP leader: Deepa Angal-Kalinin (d.angal-kalinin@dl.ac.uk)
Polarimeter experts (Peter Schuler (schuler@mail.desy.de)

5) To understand background in the detectors which may arise due to polarimetry measurements on each bunch, provide information about the density and also angular and energy distribution of the tails of the main beam, which appear due to collisions with laser beams. Then check the associated machine background effects.

Responsible: Acc.&phys requirement GWP (Deepa Angal-Kalinin) and polarimer experts

6) Specify from physics point of view, how many bunches in the train need to be measured.

Responsible: Acc.&phys requirement GWP (Deepa Angal-Kalinin) and polarimer experts

7) Laser requirements and its design need to be discussed with laser wire colleagues, to understand if it is beneficial to use the same design for both systems. Study how cost of the laser depends on the pattern of its pulses.

Responsible: Instrumentation GWP (Phil Burrows, Mike Woods) and polarimer experts and laser wire experts

8) Make sure that Magnets and PS GWP leaders receive information about required apertures and field quality for fixed field version, as well as all information about earlier design and cost estimation of polarimeter magnets done for TESLA. Magnet group to study if there was difference from what is included in RDR. The scaled field version also to be provided to Magnet grouping order to make the comparison.

Responsible: Magnets and PS GWP leaders: C.Spencer (cherrill@slac.stanford.edu)
P.Bellomo(bellomo@slac.stanford.edu)
and polarimeter experts

9) According to parameters document, giga-Z is considered as an upgrade option (Possibility to run at Z energy for detector calibration should be provided in baseline design, polarization measurements are not required). If any hardware or parameter is set to allow an upgrade, this should be identified. The energy range for 250-500GeV/beam can also be considered as achievable with upgrade, for the polarimeter, and not necessarily built into initial setup.

Responsible: Acc.&phys requirement GWP (Deepa Angal-Kalinin) and polarimer experts

10) Understand where are all BPMs in this system, their requirements and design.

Responsible: Instrumentation GWP (Phil Burrows, Mike Woods) and polarimer experts and laser wire experts

11) Evaluate collimator wakes due to MPS energy collimator and their effects on the beam. Additional wake fields from the vacuum design for fixed/scaled version also need be studied.

Responsible: Acc.&phys requirement GWP (Deepa Angal-Kalinin),
Collimation GWP leaders (Nigel Watson, Nikolay Mokhov) and polarimer experts

These issues should be studied so that in about two month we would know how we would like to change the design, allowing time for more detailed conceptual design to be developed for April’08 review.