Contribution submission to the conference Münster 2017

Polarization Measurement at the International Linear Collider (ILC) — •Robert Karl[1,2] and Jenny List[1] — [1]DESY Hamburg — [2]University of Hamburg

The ILC is a planned electron-positron collider with center-of-mass energies of up to 500 GeV, upgradeable to 1 TeV. Thereby, the electron beam will be polarized to 80% and the positron beam up to 60%. This allows a very precise measurement of the standard model parameters (e.g. for top quarks) and accurate searches for physics beyond the standard model.
To fully exploit the ILC potential, the precision of the polarization has to be known at the permille-level. This is roughly a factor 2 to 5 better than previously achieved at comparable accelerators. In addition to the direct measurement with Compton-polarimeters, the polarization can also be extracted from the long-term cross section measurement of very well known standard model processes.
In this contribution, a unified approach for measuring the luminosity-weighted average polarization will be presented combing the cross-section measurements from all suitable processes, as well as constraints from the polarimeters considering all statistical and systematical uncertainties including their correlations. In the context of the up to date ILC running scenario, the achievable precision will be presented for different center-of-mass energies. In that respect, the importance of a fast helicity reversal for both beams, which enables the cancellation of time-dependent systematic uncertainties, will be discussed.

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