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Testing the closure of the Standard Model: Tera-Z and Oku-W's at TLEP

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After the Higgs boson discovery by the LHC experiments at 126 GeV, the Standard Model has no free parameters left and measurements sensitive to Electroweak radiative corrections constitute powerful tests of the existence of weakly interacting New Physics beyond the TeV scale.
TLEP is a high luminosity circular e+e- collider to be fit in a 80-100 km tunnel as precursor and companion of a 100 TeV pp collider (VHE-LHC), as part of a possible long term vision for HEP. The machine covers the energy range from the Z pole up to above the top quark pair threshold. Luminosity at 240GeV (Higgs factory) is 5.1034 /cm2/s at each of four collision points, yielding 2 Million Higgs decays in 5 years. Luminosity increases rapidly at lower energies, offering the prospects of 1012 Z bosons or 108 W pairs per year. Transverse beam polarization for exquisite beam energy calibration should be achievable at the Z pole and WW production threshold, and longitudinal polarization at the Z peak. As a result, many precision measurements and rare decays can be revisited. The Z mass and width can be measured to better than 100 keV, the W mass better than 1 MeV, the top quark mass to 30-100 MeV and the effective weak mixing angle at the Z pole to a few 10-6. Some of the associated experimental and theoretical challenges will be highlighted.

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