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Detector Requirements and R&D Challenges at CLIC

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The expected results from the LHC experiments will give us an idea of the physics at the TeV scale. A lepton-collider at these energies will then be required to complement the information from the LHC, and to fully understand the physics. The Compact Linear Collider (CLIC) with a center of mas energy of up to 3 TeV is a suitable concept for such a future e^{+}-e^{-}-linear-collider.

The detector requirements for precision measurements at multi-TeV-energies in general and the special experimental conditions at the CLIC accelerator open a rich field of detector R&D opportunities. These requirements go beyond those for a detector at the ILC. Nevertheless, the R&D work that is being performed for the ILC detectors is an excellent starting point for these studies.

The specific challenges are for example the use of dense calorimeter absorber materials for excellent jet energy resolutions up to the highest energies and low material silicon detectors with small pixel sizes. In addition, the high machine-induced-background levels in combination with the short time of only 0.5 ns between two bunch crossings at CLIC will require time-stamping capabilities throughout all sub-detectors.

Preliminary results from the studies for the CLIC conceptual design report and ongoing R&D projects will be presented.

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