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Detector requirements for future high-energy collider experiments

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Particle detectors for operation at future high-energy collider experiments are designed in view of both their facilities' physics objectives and their experimental conditions, which differ substantially between lepton and hadron colliders as well as between linear and circular colliders. Example differences are background conditions and duty cycles, which for instance translate into very different requirements in terms of shielding, radiation-hardness requirements and cooling concepts. Furthermore the detector designs take into account cost and engineering constraints as well as anticipate future technology developments. An overview of the physics cases and experimental environments of the currently proposed future high-energy colliders is given, including CEPC, CLIC, FCC-ee and ILC for e+e- colliders, FCC-hh, HE-LHC and SppC for pp colliders as well as muon collider concepts. The corresponding detector design choices are discussed and challenges in the design are outlined.

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