

AC-LGAD based Timing tracker development for future lepton collider

The project aims to develop AC-LGAD based strip silicon sensors and detector modules for the outer tracker in future lepton colliders (CEPC, FCC-ee, ILC, CLIC, etc.). This development is crucial for enhancing the flavor physics and Higgs physics potential of these future lepton colliders.

The primary objective is to develop AC-LGAD sensors with a long strip structure. Additionally, we plan to create AC-LGAD strip sensors for the endcap region, where the strips will be oriented along the azimuthal direction. The developed sensor prototypes, along with ASICs featuring high-precision TDCs, will be used to construct detector module prototypes. These modules are expected to achieve a spatial resolution better than 10 μm (R-phi direction) and a timing resolution in the range of 30-50 ps. We anticipate that this development will significantly contribute to the technical design reports for future lepton collider projects.

Collaborative work with WG5-TB is foreseen, with potential synergies in the timing tracker development for the EIC.

The proposal document can be found in this link: <https://cernbox.cern.ch/s/eEFSdjE04icgfc1>

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Primary authors: ZHAO, Mei (Chinese Academy of Sciences (CN)); LI, Mengzhao (Chinese Academy of Sciences (CN)); SUN, Weiyi (Chinese Academy of Sciences (CN)); HUANG, Xinhui (Chinese Academy of Sciences (CN)); FAN, Yunyun (Chinese Academy of Sciences (CN)); LIANG, Zhijun (Chinese Academy of Sciences (CN))

Presenter: LIANG, Zhijun (Chinese Academy of Sciences (CN))