

WITHDRAWN - Picosecond Timing Layers for Future Calorimeters: Updates from the Askaryan Calorimeter Experiment (ACE)

Wednesday, May 26, 2021 5:12 AM (18 minutes)

We report on results from the Askaryan Calorimeter Experiment (ACE) which uses the coherent microwave Cherenkov emission from high energy particle showers in dielectric-loaded waveguides as calorimetric timing layers. Above ACE's energy threshold, a single 5 cm thick ($1.4 X_0$) layer of ACE waveguides would provide ~ 1 ps timing, 3D spatial constraints on the scale of $\sim 300 \mu\text{m}$ to 5 mm, and an additional energy measurement, making ACE a true 5D detector. When embedded inside another calorimeter technology, ACE layers could provide a powerful measurement for particle-flow algorithms as well as unique vertexing capabilities to significantly reduce pileup. Due to thermal noise limits, ACE elements have a relatively high energy threshold so they are currently limited to future high CoM colliders like the FCC-hh. We report on new simulations from deploying ACE layers in the barrel and forward calorimeters at future colliders and discuss ongoing research to further develop the ACE concept.

TIPP2020 abstract resubmission?

No, this is an entirely new submission.

Funding information

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Session Classification: Posters: Calorimeters

Track Classification: Experiments: Experiments: Calorimeters