

# Design of a Robust Fiber Optic Communications System for Future Giga-scale Neutrino Detectors

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In this work we discuss ongoing development of a hybrid fiber optic data and timing infrastructure for the future IceCube Gen2 detector. The IceCube Neutrino Observatory is a kilometer scale detector operating with 86 strings of modules. These modules communicate utilizing a custom protocol to mitigate the signaling challenges of long distance copper cables. Moving past the limitations of a copper-based backbone will allow larger future IceCube detectors with extremely precise timing and a large margin of excess throughput to accommodate innovative future modules. To this end, the upcoming IceCube Upgrade offers an opportunity to deploy a pathfinder for the new fiber optic infrastructure, called the Fiber Test System. This design draws on experience from AMANDA and IceCube and incorporates recently matured technologies such as ruggedized fibers and White Rabbit timing to deliver robust and high performance data and timing transfer.

## TIPP2020 abstract resubmission?

No, this is an entirely new submission.

## Funding information

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