



Contribution ID: 199

Type: Poster

Design, Development and Testing of 60 GHz Wireless Links for ATLAS Detector Data Readout

Wednesday 19 February 2025 11:10 (20 minutes)

The Wireless Allowing Data and Power Transmission (WADAPT) proposal was formed to study the feasibility of wireless technologies in HEP experiments. A strong motivation for using wireless data transmission is the absence of wires and connectors to reduce the passive material. However, the tracking layers are almost hermetic, acting as a Faraday cage, that allows multiple links in the volume without severe crosstalk, but doesn't allow propagation between the layers. For propagation between the layers, we have developed an active repeater board, which is passed through a 2-3 mm wide slit between the modules. The repeater is also advantageous in building topological radial networks for neuromorphic tracking. The active repeater board consists of an RX antenna, an amplifier, and a TX antenna, and is tested on a mock up in a way that the RX antenna will be on the inner side of a module, and the TX antenna will be on the outer side of the same module, as the 10 mil thick board is passed through the small slit.

Transmission through the tracking layers using the repeater has been demonstrated with two horn antennas, a signal generator, and a spectrum analyzer. For 20 cm distance between the horn antenna and the repeater board, a receive level of -19.5 dBm was achieved. In comparison, with the same setup but with the amplifier turned off, the receive level was \sim -46 dBm. This represents a significant milestone towards the implementation of 60 GHz links for detector data readout.

Primary experiment

WADAPT collaboration

Authors: AZIZ, Imran; ALEKAJBAF, Yasin (Uppsala University); Dr DANCILA, Dragos; PELCKMANS, Kristiaan; JAIN, Abhinav (Uppsala University); BRENNER, Richard (Uppsala University (SE))

Presenter: AZIZ, Imran

Session Classification: Coffee & Posters B

Track Classification: Electronics