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Advancements in Data Acquisition and Synchronization Systems for the TAMBO Experiment

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The TAMBO experiment aims to investigate the tau neutrino component within the astrophysical neutrino flux. One of our ongoing endeavors involves identifying the optimal data acquisition system (DAQ) to be used in conjunction with the synchronization system. The synchronization system plays a crucial role in identifying the air shower initiated by the tau lepton as it exits the rock.

In this context, we present two distinct DAQ prototypes. The first DAQ prototype utilizes an FPGA for high-accuracy digital processing and 4-frequency beacon wireless detection for synchronization purposes. Conversely, the second DAQ prototype is based on Red Pitaya and employs a wired synchronization system utilizing a GPS-disciplined clock.

We will implement an experimental setup comprising three scintillator planes to evaluate the wired synchronization system's performance. Each plane will be positioned at the vertex of an equilateral triangle with sides measuring ~ 80 -100 meters.

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