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## Development, Fabrication, Assembly, and Testing of the HGCal Backend System for the CMS Experiment

Our group at TIFR is participating in the development, fabrication, and assembly of backend carrier boards based on the AdvancedTCA form factor for trigger electronics of the CMS high-granularity calorimeter (HG-CAL). Specifically, we are developing a general-purpose 'Serenity' board that will be compatible with most subdetectors, including HGCal, for the Phase-2 Upgrade of the CMS experiment at CERN. Its data engine uses optical or electrical SAMTEC Firefly connectors to deliver high data throughput of up to 10 TBps per carrier board, with a processing time of 5  $\mu$ s for each collision. Approximately 250 field-programmable gate arrays mounted on Serenity boards will perform this processing at various stages. We recently fabricated and assembled Serenity pilot boards and subsequent pre-series boards in India, followed by their extensive electrical tests at TIFR and CERN. This talk will cover efforts related to the CMS backend system carried out by TIFR.

### Field of contribution

Experiment

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