

Design and first test results of a reconfigurable autoencoder on an ASIC for data compression at the HL-LHC

Monday, 3 October 2022 14:00 (5 minutes)

The High Granularity Calorimeter (HGCAL) is a new subdetector of the CMS experiment in development as part of the upgrades for the High Luminosity LHC. The HGCAL readout system includes the Endcap Trigger Concentrator (ECON-T) ASIC, responsible for algorithmically reducing the immense data volume associated with the trigger patch of this six-million channel “imaging” calorimeter. To accomplish the data reduction, a reconfigurable autoencoder algorithm has been implemented in the ECON-T. The design, optimization, and implementation of this neural network encoder and first test results of the functionality within the ECON-T ASIC prototype are presented.

Primary authors: SHENAI, Alpana (Fermi National Accelerator Lab. (US)); SYAL, Chinar (Fermi National Accelerator Lab. (US)); HERWIG, Christian (Fermi National Accelerator Lab. (US)); MANTILLA SUAREZ, Cristina Ana (Fermi National Accelerator Lab. (US)); Dr GINGU, Cristinel Veniamin (Fermi National Accelerator laboratory); NOONAN, Danny (Fermi National Accelerator Lab. (US)); BRAGA, Davide (FERMILAB); COKO, Duje (University of Split. Fac.of Elect. Eng., Mech. Eng. and Nav.Architect. (HR)); FAHIM, Farah (Fermilab); DI GUGLIELMO, Giuseppe (Fermilab); HOFF, James (Fermi National Accelerator Lab. (US)); DUARTE, Javier Mauricio (Univ. of California San Diego (US)); NGADIUBA, Jennifer (FNAL); HIRSCHAUER, Jim (Fermi National Accelerator Lab. (US)); WILSON, Jon (Baylor University (US)); KWOK, Ka Hei Martin (Fermi National Accelerator Lab. (US)); MIRANDA, Llovizna (Northwestern University); Mr VALENTIN, Manuel (Northwestern University); LUPI, Matteo (CERN); PIERINI, Maurizio (CERN); TRAN, Nhan (Fermi National Accelerator Lab. (US)); KLABBERS, Pamela (Fermi National Accelerator Laboratory); RUBINOV, Paul Michael (Fermi National Accelerator Lab. (US)); HARRIS, Philip Coleman (Massachusetts Inst. of Technology (US)); WICKWIRE, Ralph Owen (Fermilab); MEMIK, Seda (Northwestern University); SUMMERS, Sioni Paris (CERN); LONCAR, Vladimir; WANG, Xiaoran (Fermi National Accelerator Lab. (US)); LUO, Yingyi (Northwestern University)

Presenter: NOONAN, Danny (Fermi National Accelerator Lab. (US))

Session Classification: Contributed Talks