

The New ATLAS Fast Calorimeter Simulation (FastCaloSim) - Summary

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- Introduction:
 - Simulation of the calorimeter takes bulk time of the full Geant4 (G4) ATLAS simulation
 - FastCaloSim (FCS) is a parametrized calorimeter response, based on the G4 simulation of single particles, about 10 times faster than the G4 calo simulation
 - The new FCS is an advanced version of the current FCS, expected to reduce the memory need and to provide a more accurate response (eg. substructure of hadronic showers)
- Energy parametrisation:
 - G4 inputs decorrelated by using two nested principal component analyses (PCA)
 - The energy and shape parametrisation is performed per PCA bin
 - The energy distribution is approximated using an iterative regression with the MLP as implemented in TMVA, for efficient storage in memory (storing only the MLP weights)
- Shower shape parametrisation:
 - Optimized binning of hit distribution as a function of radial distance r and angle α
 - Regression of energy density as function of r and α , using MLP method in TMVA
 - Simple shape parametrisation based on functional fits instead of neural network
- Hit- to-Cell assignment:

The accordion structure of the LAr is taken into account via a probability function when assigning the calo hits to cells
- Prototype is currently developed, to be integrated into the ATLAS software (ATHENA) soon