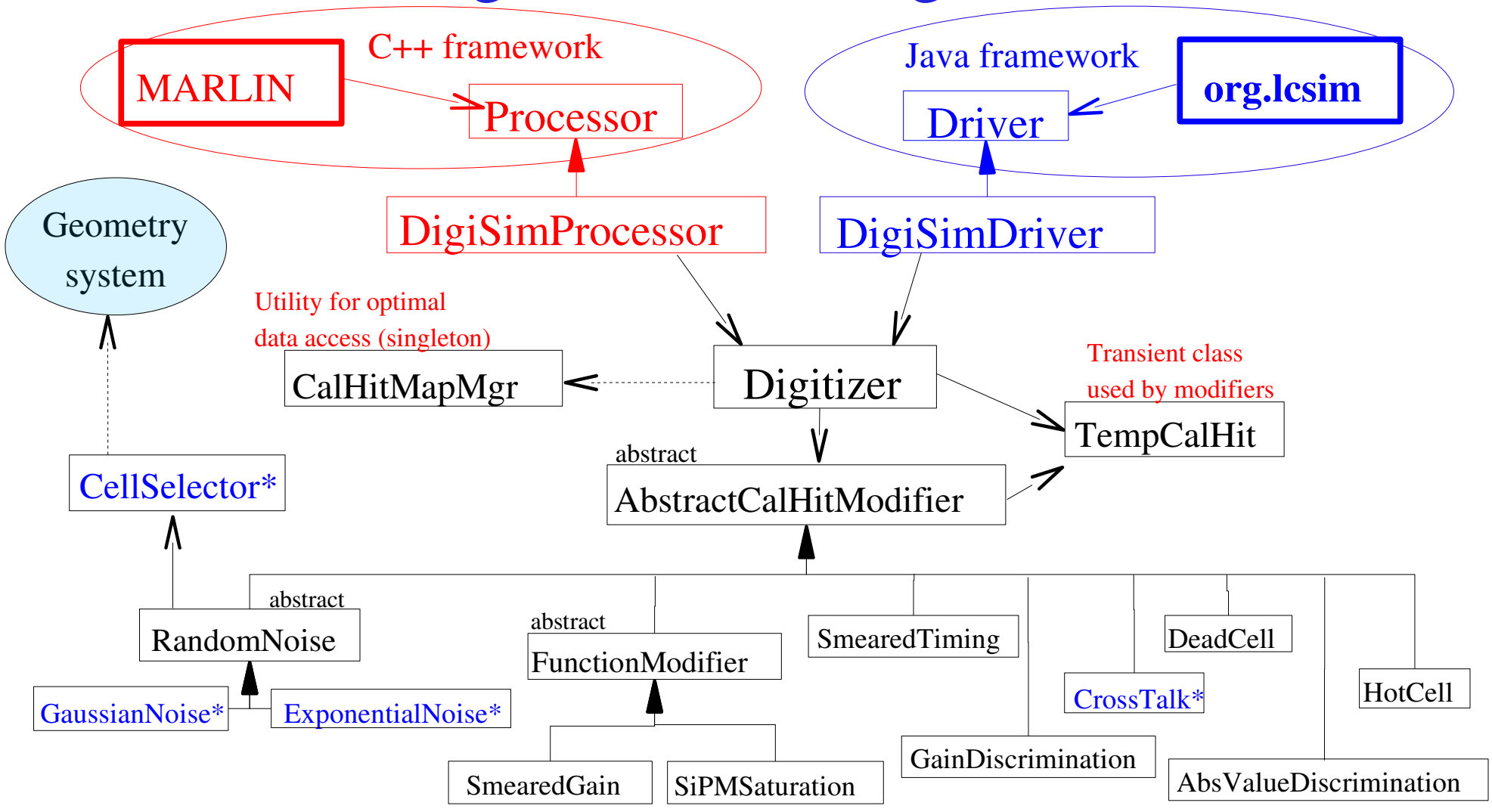
Purpose of DigiSim

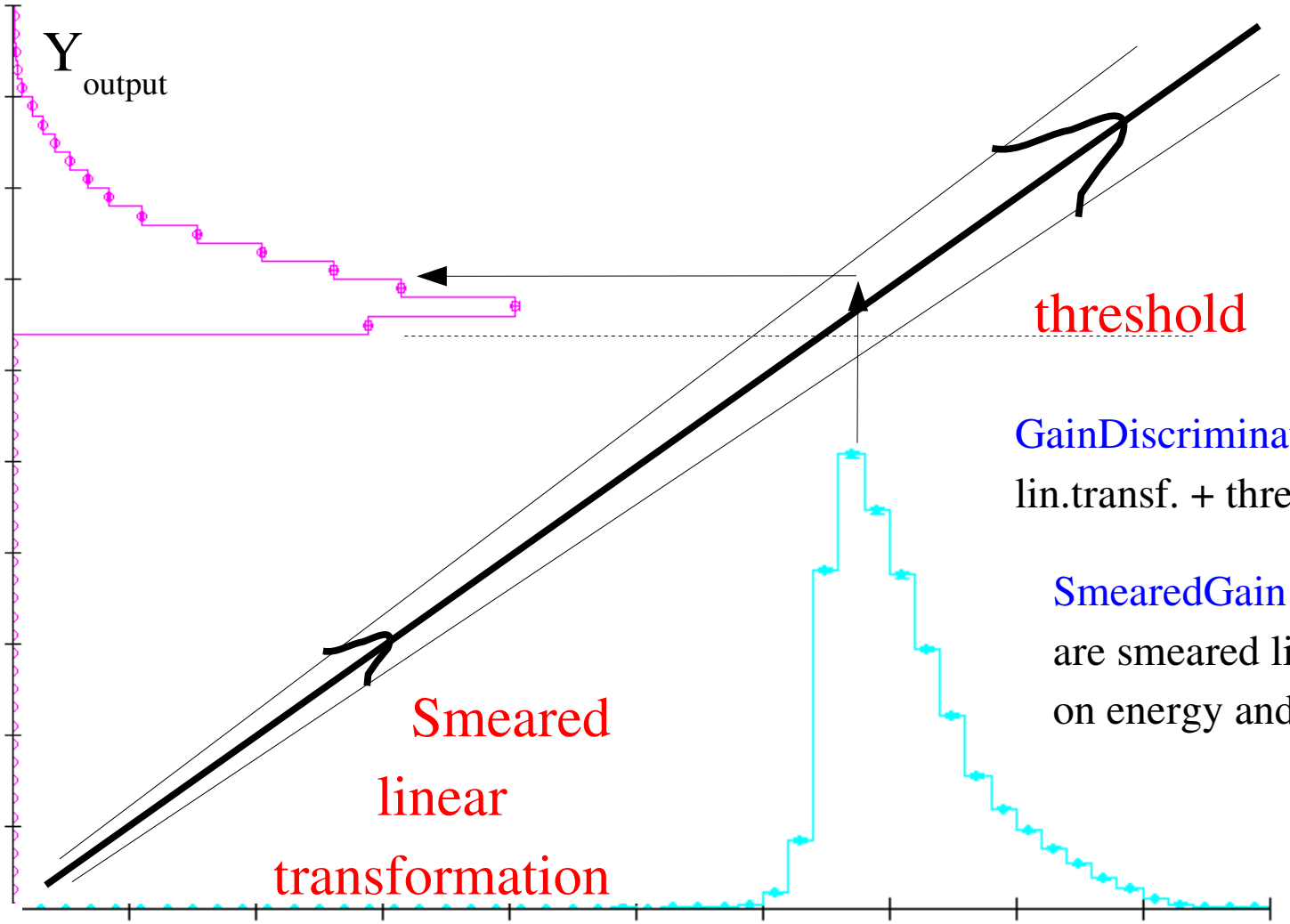
- Goal: a program to parametrically simulate the signal propagation and digitization processes for the ILC detector simulation
  ☞ an important tool for comparing different detector technologies
- DigiSim role is to convert the simulated data (energy depositions and hit timings) into the same format AND *as close as possible* to real data from readout channels, while preserving all MC information from input data files
  - *As close as possible* means that all known effects from digitization process should be taken into account, if possible: cell ganging, inefficiencies, noise, crosstalks, hot and dead channels, non-linearities, attenuation, etc.
- Same reconstruction & analysis software can be used for MC and real data
- DigiSim produces RawCalorimeterHits and/or calibrated (Sim)CalorimeterHits from (ideal) SimCalorimeterHits generated by Geant4.

DigiSim class diagramS



* Implementation depends on some desirable features, still not available in Gear.

A common transformation

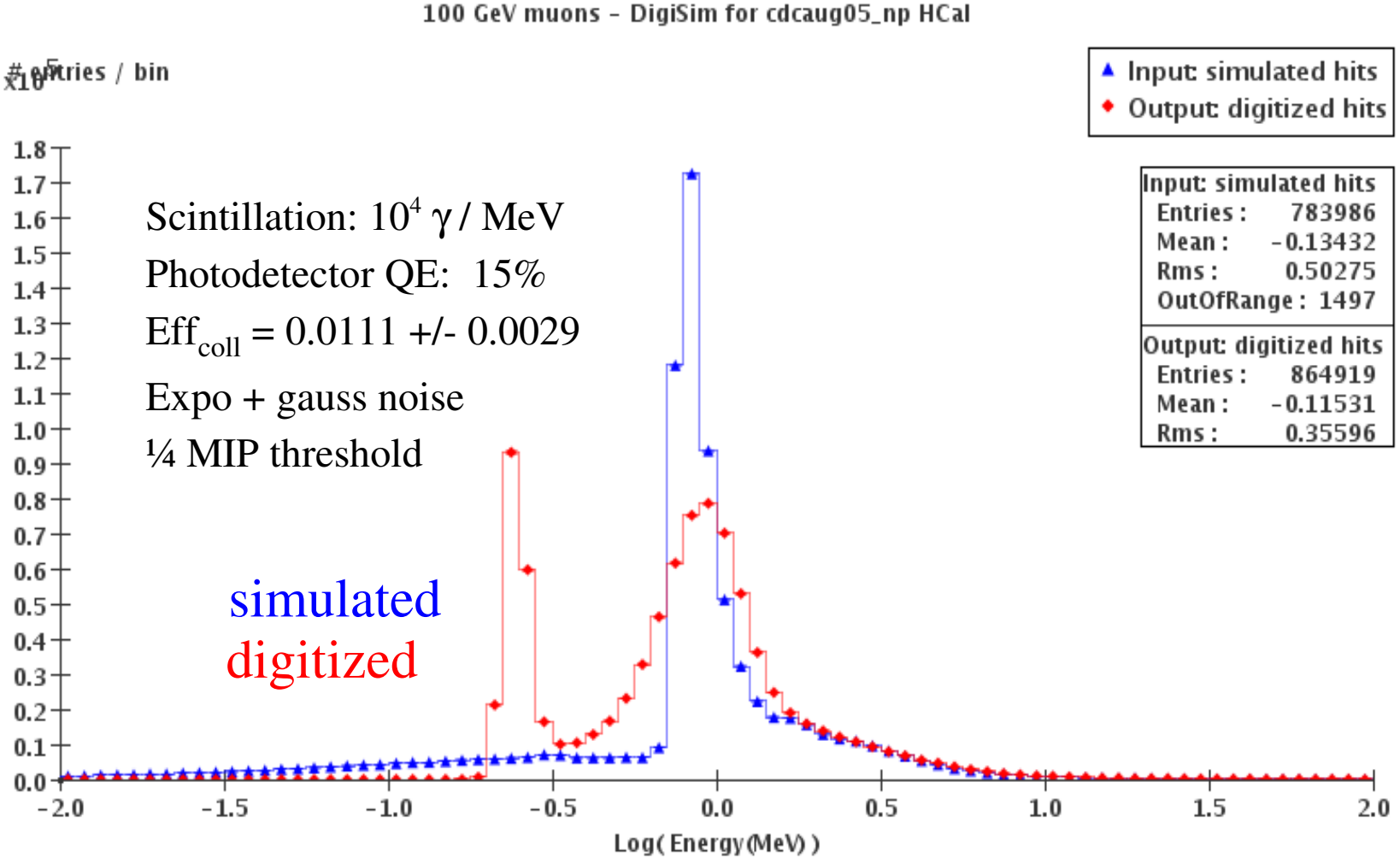


GainDiscrimination is a smeared lin.transf. + threshold on energy

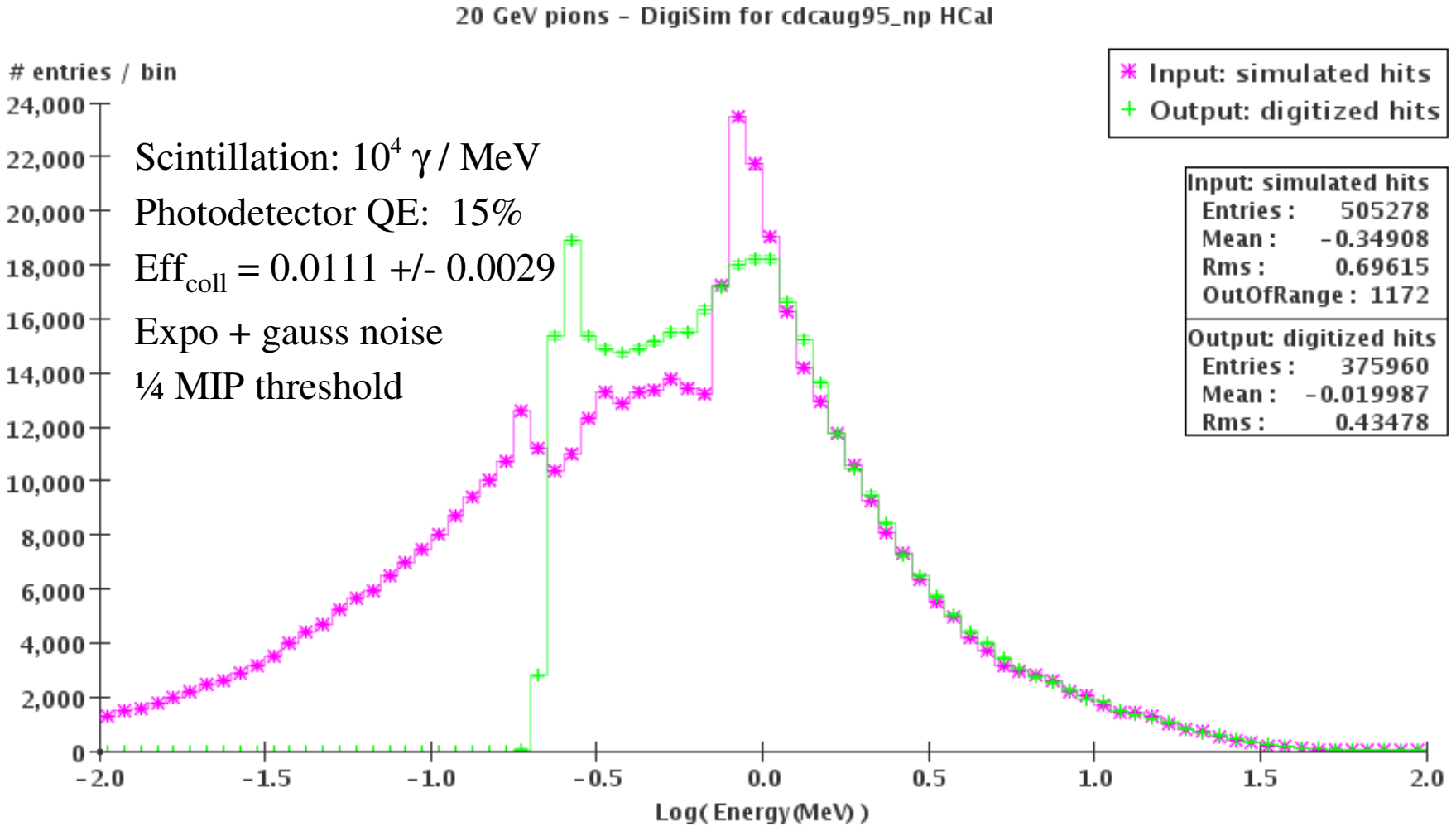
SmearedGain and SmearedTiming are smeared linear transformations on energy and time respectively

nicadd

HCal scintillator digitization (preliminary)



HCal scintillator digitization (preliminary)



DigiSim Status

- A digitization simulation package, DigiSim, has been developed at NICADD / NIU
  - Java version released is full featured. Same configuration file as C++ (Marlin steering file)
  - C++ version partly available. Same basic structure, but some functionality is missing (crosstalks and noise modeling), hopefully to be implemented soon
  - Calibrated (Sim)CalorimeterHits can be directly compared to calibrated real data
- Both C++ and Java versions are available through official CVS servers
  C++ in the Calice CVS repository and Java in the LCSim CVS repository
- DigiSim can be run in either a stand-alone mode to produce persistent LCIO output, or as an on-the-fly preprocessor to reconstruction/analysis
- Documentation available from http://nicadd.niu.edu/digisim, including build instructions
- Comments are welcome: lima@nicadd.niu.edu