Contribution ID: **103** Type: **Oral presentation using Zoom**

New approach to validation of simulations with highly granular calorimeters using machine learning technique

Thursday, 28 October 2021 16:18 (24 minutes)

An estimation of detector performance for future particle physics experiments relies both on prototypes tests and on detector simulation quality. Though the most used packages like Geant4 demonstrate quite good agreement, at percent level, for many observables, they are not perfect yet in the description of topological aspects of hadronic shower development, which are important for Particle Flow reconstruction. Highly granular calorimeters provide a wide spectrum of calorimetric observables and help to go deeper in our understanding of the source of discrepancies between data and simulations. In this work, we show the relationships between observables, which are available in the highly granular CALICE analogue hadron calorimeter, and properties of secondaries generated by Geant4 during hadronic shower propagation. In the new approach proposed, several calorimetric observables are used as inputs to a neural network and the output/target variable is one of the properties of secondary particles in a shower. The regression model is trained using a supervised learning. The achieved performance of the model and perspectives of its implementation for validation of hadronic shower simulations at secondaries level are discussed.

1st preferred time slot for your oral presentation

19:00-21:00 JST (12:00-14:00 CEST, 6:00-8:00 EDT, 3:00-5:00 PDT)

2nd preferred time slot for your oral presentation

15:30-17:30 JST (8:30-10:30 CEST, 2:30-4:30 EDT, 23:30-1:30 PDT)

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Session Classification: A&B: Software/Computing & Calorimeters

Track Classification: Parallel sessions: Detectors: Session A: Software / Computing