

The CMS Simulation Validation Suite

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Monte Carlo simulations are a critical component of physics analysis in a large HEP experiment such as CMS. The validation of the simulation software is therefore essential to guarantee the quality and accuracy of the Monte Carlo samples. CMS is developing a Simulation Validation Suite (SVS) consisting of a set of packages associated with the different sub-detector systems: tracker, electromagnetic calorimeter, hadronic calorimeter, and muon detector. The Suite also contains packages to verify detector geometry parameters, and the magnetic field. Each package consists of one or more tests running on single particle or collider samples, producing distributions of validation quantities which are checked against reference values. The tests are performed at different levels or modes, to verify from the basic objects such as “hits” to more complex physics quantities such as resolutions, and shower profiles.

Primary authors: Prof. KHARCHILAVA, Avto (SUNY at Buffalo, USA); Dr SHABALINA, Elizabeta (University of Illinois at Chicago, USA); Dr CHEUNG, Harry (Fermi National Accelerator Laboratory (FNAL)); Dr YARBA, Julia (Fermi National Accelerator Laboratory (FNAL)); Dr ARCE, Pedro (Ciemat, Spain); Dr ABDULLIN, Salavat (Fermi National Accelerator Laboratory (FNAL)); Dr BANERJEE, Sunanda (Tata Institute of Fundamental Research, India); Dr ELVIRA, Victor Daniel (Fermi National Accelerator Laboratory (FNAL)); Dr DING, Xiaoping (Nanjing University, P. R. of China (visitor at FNAL)); Dr HUANG, Xingtao (University of Puerto Rico (Mayaguez), USA)

Presenter: Dr ELVIRA, Victor Daniel (Fermi National Accelerator Laboratory (FNAL))

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