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An Object-Oriented Simulation Program for CMS

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The CMS detector simulation package, OSCAR, is based on the Geant4 simulation toolkit
and the CMS object-oriented framework for simulation and reconstruction.
Geant4 provides a rich set of physics processes describing in detail electro-magnetic
and hadronic interactions. It also provides the tools for the implementation of the
full CMS detector geometry and the interfaces required for recovering information
from the particle tracking in the detectors.
This functionality is interfaced to the CMS framework, which, via its "action on
demand" mechanisms, allows the user to selectively load desired modules and to
configure and tune the final application.
The complete CMS detector is rather complex with more than 12 million readout
channels and more than 1 million geometrical volumes.
OSCAR has been validated by comparing its results with test beam data and with
results from simulation with a GEANT3-based program.
It has been succesfully deployed in the 2004 data challenge for CMS, where ˜20
million events for various LHC physics channels were simulated and analysed.

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