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   Soggetti   Imaging systems in medicine
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   Sommario/riassunto   The CMS object oriented Geant4-based program is used to simulate the
                          complete central CMS detector (over 1 million geometrical volumes)
                          and the forward systems such as the Totem telescopes, Castor
                          calorimeter, zero degree calorimeter, Roman pots, and the luminosity
                          monitor. The simulation utilizes the full set of electromagnetic and
                          hadronic physics processes provided by Geant4 and detailed particle
                          tracking in the 4 tesla magnetic field. Electromagnetic shower
                          parameterization can be used instead of full tracking of high-energy
                          electrons and positrons, allowing significant gains in speed without
                          detrimental precision losses. The simulation physics has been validated
                          by comparisons with test beam data and previous simulation results.
                          The system has been in production for almost two years and has
                          delivered over 100 million events for various LHC physics channels.
                          Productions are run on the US and EU grids at a rate of 3-5 million
                          events per month. At the same time, the simulation has evolved to
                          fulfill emerging requirements for new physics simulations, including
                          very large heavy ion events and a variety of SUSY scenarios. The
                          software has also undergone major technical upgrades. The framework
                          and core services have been ported to the new CMS offline software
                          architecture and event data model. In parallel, the program is subjected
                          to ever more stringent quality assurance procedures, including a