Colloque Numerique Suisse
Ecole Polytechnique Federale de Lausanne (EPFL)
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"CFD simulations of LHC Experiments"
CERN CFD team poster
www.cern.ch/cfd

ABSTRACT

CERN is the European Organization for Nuclear Research, the world's largest particle physics laboratory and the birthplace of the World Wide Web. Its primary objective is to provide the scientific community with facilities to study the sub-nuclear particles and forces of matter. Most of the activities at CERN are currently directed towards building a new particle accelerator and collider, the Large Hadron Collider (LHC) and the detector experiments for it. Construction of these experiments requires an extraordinary engineering effort and the CFD team of TS/CV/DC Section has been asked to develop numerical simulations of thermal-fluid related problems, particularly during the development, design and construction phases of the LHC experiments. The poster will focus on studies performed for the experiments currently being built to run on the collider, for example, a 2D transient simulation of the thermal behaviour of ATLAS cavern and a 3D steady-state natural convection study of the ALICE Muon magnet. These CFD numerical studies ran on the high performance dual Intel Itanium® processor cluster named Openlab (www.cern.ch/openlab) available at CERN. Calculation performances increased approximately 8 times since the Openlab cluster as been used for CFD calculation.

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