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CFD humidity and temperature modelling in the ATLAS ITK Strip

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CERN has planned a series of upgrades for its Large Hadron Collider (LHC). Rearmost in this current series of planned upgrades is named the High Luminosity LHC (HL-LHC) and as the name suggests will bring the instantaneous Luminosity up to 21×10^{34} \mbox{cm}$^{-2}$\mbox{S}$^{-2}$. The ATLAS detector will be substantially changed to meet the challenges of this upgrade (termed the "Phase II" upgrade). Many systems and subsystems require the most radical changes.
The ATLAS Inner Tracker (ITk) is being completely rebuilt for Phase II. The changes to the pixel detector system, and the barrel and end-cap strip detector systems need global monitoring of the temperature, humidity and dew point inside the detector volume with a goal of keeping the ATLAS ITK dry. Hence, it is important to have a simulation of multi-species fluid flow in the ATLAS ITk.
We use CFD simulation to develop a quantitative understanding of the fluid flow within the ITk as a result of the dry nitrogen purge, the temperature environment, the humidity under normal conditions, and operating conditions.

Apply to be considered for a student ; award (Yes / No)?

No

Level for award;(Hons, MSc, PhD, N/A)?

N/A

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