



Contribution ID: 302

Type: **Oral**

Heat inflows to cold elements of cryogenic installation in a case of sudden vacuum loss

The Large Hadron Collider at CERN requires a helium cryogenic system of total inventory greater than 100 tons of helium. The process of selection of safety apparatus in cryogenic installations should take into account, among others, a risk of ventilation of the system with atmospheric air. Failure results in large heat input to cold components. Already done experimental work has shown the amount of heat inflowing to the helium reservoir. Helium containing tanks are shielded with active radiation screens which's temperatures are within the range of 50-80 K. On the outside, the screens are wrapped with 30-40 layers of insulation, while the inside is remained bare. Depending on the temperature of the screen, one can distinguish three main mechanisms of heat transfer: convection, condensation and cryosorption. The presentations will cover the above issues, mainly focusing on the problem of heat transfer modeling.

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Track Classification: Particle Accelerators and Nuclear Reactors