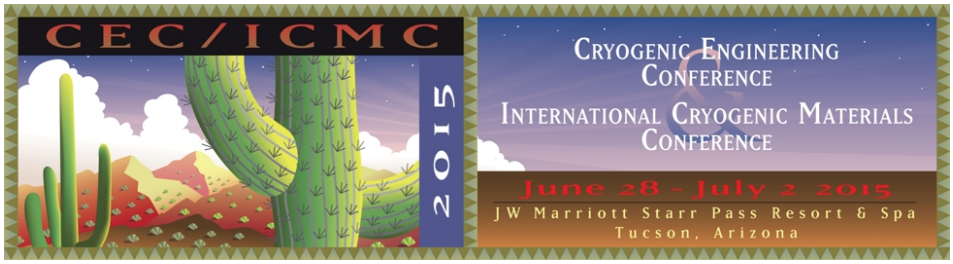

Contribution ID: **155** Type: **Contributed Oral Presentation**

Safety related issues of the unexpected Argon release into the tunnel

Wednesday, 1 July 2015 14:00 (15 minutes)

Modern physics laboratories require very large amounts of cryogenics fluids. Often the fluid must be transported along the tunnels or stored in the underground cavities. Currently there is several ongoing projects where vary large amounts of liquid (LAr) or gaseous Argon (GAr) will be used. One of them is a part of LAGUNA-LBNO (Large Apparatus studying Grand Unification and Neutrino Astrophysics and Long Baseline Neutrino Oscillations) design study, where GLACIER neutrino detector is considered. For its proper operation it requires appropriate environment (It must be located in the deep underground cavity) and approximately 150000 tons of LAr. This huge amount of cryogen must be transported down the tunnel in cryogenic-tank trucks or using pipelines. In both cases there is a risk of uncontrolled LAr or GAr leak to the tunnel which can be dangerous for people and installation itself.
The presented work focuses on the risk analysis and the consequences of the Argon unexpected leak to the tunnel. It shows the mathematical model and numerical tools which can serve to model the Argon cloud propagation, temperature distribution and Oxygen deficiency. Results present series of numerical experiments of the Argon leak into the tunnel for different external conditions (e.g. different ventilation regimes).

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Session Classification: C3OrH - Cryogenic Safety

Track Classification: CEC-11 - Safety, Reliability, and Standards