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Numerical study of emergency cryogenics gas relief into confined spaces

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The presented work focuses on the risk analysis and the consequences of the unexpected leak to the tunnel of cryogenics gases. Formation of the gas mixture and its propagation along tunnels is an important issue for the safe operation of cryogenic machines, including superconducting accelerators or free electron lasers. As the cryogenics gas the helium and argon will be considered. A minimal numerical model will be presented and discussed. Series of numerical results related to emergency helium relief to the CERN tunnel and related to unexpected leak of the argon to an underground tunnel, will be shown. The numerical results will show temperature distribution, oxygen deficiency and gas cloud propagation in function of intensity of the leak and intensity of the ventilation.

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