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The PICARD Test Facility - KIT/CERN Collaboration on Cryogenic Pressure Relief Experiments

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The test facility PICARD, which stands for Pressure Increase in Cryostats and Analysis of Relief Devices, has been designed, constructed and commissioned for cryogenic safety experiments. With a cryogenic liquid volume of 100 liter, a nominal design pressure of PN16 and helium relief flow rates up to 4 kg/s, the test facility allows the systematic investigation of hazardous incidents in cryostats under realistic conditions.

PICARD aims to study the process dynamics of heat fluxes and relief flow rates during cryogenic safety incidents in the frame of a R&D collaboration between KIT and CERN. This involves venting of the insulating vacuum with air or gaseous nitrogen using different venting hole diameters, thermal insulations, liquid levels and the set pressures. A further focus is on the occurrence and the implications of two-phase flow during expansion, and on the operating characteristics of safety relief devices.

In this contribution, the test facility PICARD is presented. Exemplary results of venting experiments with regard to the pressure increase and heat flux densities are discussed and compared to literature data.

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