



Contribution ID: 85

Type: **Poster Presentation**

Application of plate-fin heat exchangers with different UAs for mitigating the effects of pulsed heat load

The heat loads of the superconducting magnets in an international fusion device are pulsating with time, which will cause the variation of the return mass flow of the refrigerator. It is necessary to mitigate the fluctuation of the mass flow to avoid the performance degradation of turbines and compressors which designed to operate in a narrow range of mass flow. In this paper, a novel technical was suggested after thermodynamic analysis, where a traditional single heat exchanger was replaced by two plate-fin heat exchangers in cold end. Though reasonable selection of the UAs, the mass flow fluctuation could be decreased. The results of the dynamic simulation revealed that the fluctuation of mass flow only occurred in the short time, the average mitigation was greater than 95%.

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Track Classification: CEC-01 - Large-Scale Refrigeration and Liquefaction