Contribution ID: **155** Type: **Poster presentation (105min)**

Modeling and Dynamic Simulation of a Large Scale Helium Refrigerator

Tuesday 8 July 2014 14:15 (1h 45m)

In order to simulate the transient behaviors of a newly developed 2kW helium refrigerator, numerical models of the critical equipments, including a screw compressor with variable-frequency drive, plate-fin heat exchangers, a turbine expander, and pneumatic valves were developed. Meanwhile the related control strategies were involved. To validate these models, dynamic simulation was set to reproduce the start-up process of warm compressor station with gas management system and the cool-down process of cold box in actual operation. The calculation of helium thermodynamic properties was based on 32-parameter modified Benedict-Webb-Rubin (MBWR) state equations in the simulation. Furthermore dynamic response and stability of the simulation system were analyzed and discussed under different disturbances. The reliability of the developed models was verified by comparing the simulation results with the experimental data.

Author: Ms LV, Cui (1Key Laboratory of Cryogenics, Technical Institute of Physics and Chemistry Chinese Academy of Sciences, Beijing 100190, China 2University of Chinese Academy of Sciences, Beijing 100049, China)

Co-authors: Prof. WU, Jihao (1Key Laboratory of Cryogenics, Technical Institute of Physics and Chemistry Chinese Academy of Sciences, Beijing 100190, China); Prof. LI, Qing (1Key Laboratory of Cryogenics, Technical Institute of Physics and Chemistry Chinese Academy of Sciences, Beijing 100190, China); Prof. XIE, Xiujuan (1Key Lab of Cryogenics, Technical nstitute of Physics and Chemistry Chinese Academny of Science); Mr QIU, Yi'nan (1Key Laboratory of Cryogenics, Technical Institute of Physics and Chemistry Chinese Academy of Sciences, Beijing 100190, China 2University of Chinese Academy of Sciences, Beijing 100049, China)

Presenter: Prof. XIE, Xiujuan (1Key Lab of Cryogenics, Technical nstitute of Physics and Chemistry Chinese Academny of Science)

Session Classification: Tue-Af-Posters Session 1.1

Track Classification: C-01: Large scale refrigeration, liquefaction