
Contribution ID: **95** Type: **Poster presentation (105min)**

# Onset of thermoacoustic oscillations in flexible transfer lines for liquid helium

*Thursday 10 July 2014 10:30 (2h 15m)*

The onset of thermoacoustic oscillations (TAO) in transfer lines results in an increased evaporation rate of stored cryogen. As a consequence the re-liquefaction effort increases as well as the observed pressure rise in the storage dewar, whereas the latter may cause critical pressure levels. Therefore, the onset of TAO has to be mitigated. The onset of TAO in flexible transfer lines at liquid helium decant stations is barely regarded since TAO only occur at idle state, i. e. no liquid helium is transferred and most parts of the transfer line are near ambient temperature.
The examination of prototype transfer lines with built-in pressure and temperature sensors resulted in a unique knowledge of the characteristics of TAO in liquid helium transfer systems. An extensive monitoring of the transfer line in idle state led to results over a wide parameter range. Varied parameters are the liquid level in the storage dewar, the storage pressure, and geometrical dimensions of the transfer line.
The presented paper considers TAO as a common phenomenon in idle flexible transfer lines at decant stations. The conditions for the establishment and strategies for the prevention of TAO are examined. In addition, the resulting heat leak to the stored liquid helium is estimated by a thermodynamic model.

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**Session Classification:** Thu-Mo-Posters Session 3.2

**Track Classification:** C-05: Cryostat technology