



Contribution ID: 119

Type: **Poster Presentation**

The Study of Flow Performance inside a High-speed Radial-axial Flow Cryogenic Turbo-expander impeller

In this paper, an optimization design for whole performance of a high-speed radial-axial flow cryogenic turbo-expander is discussed. The main structural parameters of the expander blade are obtained through a design method based on one-dimension steady flow. The non-developable ruled parabolic shaping method is used to design the leaf type. Then numerical simulation and detailed analysis are carried out based on the designed turbine with its given working condition using CFD software. At last the temperature field, pressure field, streamlines and isentropic efficiency are obtained, and the optimization design including the geometry of impellers and boundary conditions for an efficient turbo-expander is achieved.

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Track Classification: CEC-05 - Expanders, Pumps, Compressors, and Regenerators