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C1Po1A-02 [23]: A novel hydrogen turbo-expander with active magnetic bearings and an eddy current brake

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A cryogenic expander for hydrogen liquefier with active magnetic bearings and an eddy current brake was designed and will be made and tested. The shaft design and strength review is very important factors for the turbine since it affects the performance and safety of the expander significantly. In order to product lower temperature hydrogen, the liquefier needs a very small and high-speed turbo-expander. But there are few studies of expander with both active magnetic bearings and eddy current brakes. In this study, the speed of the turbine is up to 100000 rpm. Its cooling power is 3kw. The inlet pressure is 1Mpa and the outlet pressure is 0.8Mpa.Under this condition, the turbine was designed and the simulation was done via COMSOL Multiphysics.

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