



Contribution ID: 51

Type: **Talk**

# Tower Vacuum Cryo-pumping

Tower Vacuum pumping is a challenge driven by the stringent ‘one order of magnitude better than 2G’ residual pressure requirement and the high, variable gas loads from the large and complex in-vacuum experimental assemblies. We propose cryogenics as the most effective and potentially only solution for towers pumping, also for the HF interferometer.

In an initial feasibility test, we considered an ideal gas load scenario with minimal polymeric materials, very low-outgassing materials, and strict compartmental separation. In this analysis, we address a more realistic case, accounting for potential leaks, higher gas loads during commissioning phases, and a more flexible approach to in-vacuum material selection. The priority remains the detector duty cycle: gas loads from the towers are not constant, with significantly higher levels during the commissioning phases, which can last several years and involve frequent in-tower interventions. Additionally, we recommend to consider a general safety margin into the overall vacuum system design. While several design details remain to be finalized, the goal at this stage is to estimate the total cryogenic pumping surface, allowing us to appropriately size the cryogenic plant. Detailed cryopump positioning and calculations will be addressed in a later phase.

### For talks:

I want to present a poster if I cannot get a talk slot.

**Primary authors:** PASQUALETTI, Antonio; GARGIULO, Julien; ZELENNOVA, Tatiana

**Presenter:** PASQUALETTI, Antonio

**Session Classification:** Instrument Science Board (ISB)

**Track Classification:** ISB: Vacuum and Cryogenics