

Cryopump concept of ET-LF - vacuum pumping and heat load aspects

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In order to achieve the demanding vacuum conditions in ET-LF around the cryogenic mirror, extensive TPMC simulations with the in-house code ProVac3D have been performed to find an appropriate concept of cryopumps. Herewith, it was distinguished between light gases like hydrogen and heavy gases like water. Since the gas flows to be managed as well as the requirements are strongly different, the pumping concept comprises sections at 80 K for water pumping and sections at 3.7 K for hydrogen. It turned out that for water not the pressure requirement is the design driving value but an acceptable time for the built-up of one monolayer water at the mirror as the required upper limit by optic reasons.

While all vacuum demands were fulfilled, thermal aspects around the mirror with its limited thermal budget required further design elements.

In this presentation, all relevant simulation results, justifying the cryopump concept, are shown. Furthermore, all additional design aspects for the thermal management are explained. Finally, the recently available assumption of the resulting cryopump heat loads, important to scale the needed cryogenic infrastructure, is given.

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