

Cryogenic Developments for the Einstein Telescope (invited)

Wednesday 24 July 2024 11:00 (30 minutes)

The Einstein Telescope (ET) is a third-generation gravitational wave detector planned in Europe, combining a low-frequency (LF) and a high-frequency (HF) laser interferometer. To exploit the full scientific potential of ET, cryogenic operation of the ET-LF core optics is crucial to suppress the fundamental suspension thermal noise, which dominates the detection sensitivity at low frequency, to the limits of Newtonian noise. This requires a new key technology development in ultra-low noise cryogenic cooling. Around the optics, the cryogenic design is driven by extreme-high vacuum requirements to limit particle adsorption. The presentation gives an overview on the development status of cryopumping, thermal shielding and detector cooling concepts, and the cryogenic infrastructure planning of this large-scale underground experiment.

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Session Classification: Wed-Or7

Track Classification: Tracks ICEC 29 Geneva 2024: ICEC 01: Large scale refrigeration and liquefaction