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Sorption-based vibration-free cryogenic cooling for ET and ETPathFinder

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One of the key enabling technologies in the third generation laser-interferometer GW detectors is the cryogenic system required for cooling the main optics to 10 –20K. Accounting for the extreme sensitivity that is targeted, it is of paramount importance that the cryogenic cooling under continuous operation is essentially vibration free. Joule-Thomson cryocoolers using sorption compressors are known to generate an absolute minimum of vibrational noise. Based on the heritage acquired in projects for ESA and E-ELT, the University of Twente has proposed a modular cryochain design comprising of sorption compressors and JT cold stages. In the workshop presentation, the basic operation of the cooler is discussed plus the conceptual design of the cooler chain for ETPF.

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