

Vibration analysis of ETpathfinder cryogenic heat-links

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The Einstein Telescope pathfinder (ETpathfinder) is a cryogenic testbed for the next generation of gravitational-waves antennas. To reach the target temperature of 18 K, ETpathfinder cryogenic payloads are designed to extract heat from the test masses by integrating low stiffness and highly conductive heat-links that connect to the cryocoolers. Since the interferometer test masses are very sensitive to mechanical vibrations, the noise from the cryocoolers through the heat conductor should be carefully monitored and controlled. This work presents the modeling and experimental measurements of the mechanical vibrations transferred by the heat-links in a dedicated payload setup. To investigate the stability criterion of the cold-head, seismic noise propagated via the heat-links is then projected to the displacement sensitivity of ETpathfinder.

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