

Crystalline Silicon Blades- Suspension system for Einstein Telescope Project

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The ET-LF test masses will be at cryogenic temperature. A new suspension idea was proposed to ensure good thermal conductivity, low mechanical stress, and low thermal noise. The idea is based on the use of flexural joints in compression. The disadvantage of this suspension is that vertical frequencies are high (16 Hz) and there are many possibilities that the 4 suspensions have a different load (different stress) value on the surface. Silicon is a high-quality factor material and ideally silicon vertical springs could provide low-thermal-noise attenuation, however the allowable tensional stress in crystalline springs result in vertical resonance frequency too high for attenuation. Reducing the vertical resonance frequency and/or to reduce the difference in stress between the suspensions.

Primary author: APPAVURAVTHER, ESRA ZERINA (Nikhef)

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