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Measurements of multi-material coatings using a cryogenic nodal support

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Future gravitational wave detectors plan to operate at cryogenic temperatures using crystalline silicon test masses which are transparent at higher wavelengths of light. Here we present measurements of a multi-material coating design that uses layers of ion-plated tantala, silica and amorphous silicon to reduce coating thermal noise and produce low optical absorption at low temperatures. Here we present the first cryogenic mechanical loss measurements (4K –300K) of these coatings carried out on silicon disks using a cryogenic nodal support.

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