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Methods for Cryogenic Mechanical Loss Measurements

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Even at cryogenic temperature the thermo-elastic effect can hinder mechanical loss measurements of coatings deposited on crystalline substrates by coupling the different contributions, from the substrate and from the coating itself, to the loss angle. We show here that a careful choice of the geometry of the substrate can drastically reduce this effect allowing more accurate measurements of the quality factor of novel coatings for the next generation of gravitational wave detectors. We also show the results of a recent investigation on the mechanical losses of sapphire substrates.

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