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Measurement of the thermo-optic effect in IBS SiN_x coating

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Thermo-optic noise is one of the possible sources of coating thermal noise that affects precision optical measurements, such as gravitational-wave detectors. A lot of effort is dedicated to identify coatings with low Brownian noise, but also coating thermo-optic noise should be considered as a possible limiting noise source for the next generation of GWDs mirrors. SiN_x is one of the most promising new materials for new mirror coatings and a first measurement of thermo-optic parameters has been performed. This kind of measurement permits to know a linear combination of thermal expansion (α) and thermo-optic (β) coefficients. In the near future an evaluation of the thermal expansion coefficient will be carried out by measuring the curvature variation of a coated cantilever as a function of temperature.

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