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Electromagnetic Derivation of Thermal Noise in Grating Reflectors

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Coating thermal noise is known to be a crucial limitation of future gravitational wave detectors'sensitivity. As a potential solution for this issue is given by replacing conventional multilayer based optical components by monolithic crystalline grating reflectors. In this contribution thermal noise in grating reflectors is directly related to the electromagnetic field distribution in these structures. The presented results enable the physical understanding of noise processes in grating reflectors and provide the possibility for a targeted optimization of the structure parameters for minimized thermal noise in the future.

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