

Thermal noise limit

Parameters needed for thermal noise calculation

Description	Material	Parameter name	Value	Comment
Boltzmann constant		kb	$1.38064852 \times 10^{-23} \text{ m}^2 \text{ kg s}^{-2} \text{ K}^{-1}$	
Temperature (K)		T	300	
Poisson Ratio of substrate	Fused Silica	σ_{sb}	0.16	Fused Silica substrtae [1]
Poisson Ratio of coating	AlGaAs	σ_c	0.32	AlGaAs coating [2]
Young's modulus of substrate	Fused Silica	E_{sb}	72.7 Gpa	Fused Silica substrtae [1]
Young's modulus of spacer	ULE	E_{sp}	67.6 Gpa	ULE Spacer [1]
Young's modulus of coating	AlGaAs	E_c	100 Gpa	AlGaAs coating [2]
Length of cavity		L	0.48 m	Sr Beast [3]
Spacer radius		R_{sp}	0.045 m	Sr Beast [3]
Central bore radius of spacer		r_{sp}	0.0065 m	Sebastian Häfner Thesis page 83
Thickness of coating	AlGaAs	D	$6.83 \cdot 10^{-6} \text{ m}$	AlGaAs coating [2]
$1/e^2$ mode radius on the mirror		w	0.000488 m for Mirror 1 0.000677 m for Mirror 2	Mode calculations

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