

E060178-03-D

AOS Pick Off Beam Suspension and ETM Telescope Suspension Requirements

Proposal to AOS from SUS on two Advanced LIGO Suspensions

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Updated March 29, 2006

Updated June 14, 2006

Updated July 13, 2006 – structure length changed for both.

Suspension requirements derived from conversation with Mike Smith on Wednesday, September 8, 2004.

Requirement/ Assumptions	AdLIGO Pick-Off SUS	ETM Telescope SUS	comment
Component size	350mm dia x 60mm thick (= BS)	200mm x 750mm long cylinder	Components costed by AOS
Component mass	5.8 kg (no bezel)	9.5 kg	
Isolation	Double pendulum	Double pendulum	No blade springs
Beam height	-150mm	-80.5mm (=ETM _{x1}) -87.68 (=ETM _{y1})	w.r.t. LIGO global coordinate system Ref: T010076, D. Coyne
Structure length	2005mm + 70mm = 2075 mm [81.7" = 6.8'] 1444 mm 1411mm	2005mm [78.9"=6.6'] 1616 mm 1744mm approx.	70 mm = BS beam height – 150mm global - minus ETMx beam height.
Length restrictions	Beam underneath	No restrictions beneath telescope	
Chamber	BSC, w/ beamsplitters	BSC, w/ ETMs	
Local Damping	Yes	Yes	Damping in pitch, yaw, longitudinal & transverse
DC bias/pointing	Pitch and yaw, at upper mass: +/- 50 microrad precision	Pitch and yaw, at upper mass: +/- 50 microrad precision	
Coarse pointing	Pitch and yaw, at upper mass: +/- 2 mrad range	Pitch and yaw, at upper mass: +/- 2 mrad range	For alignment
Structure resonance	Same as ETM	Same as ETM	Assume stiff upper structure and lightweight catcher/stop assembly
Prototypes	No	No	1 st article only
Fibers /music wire	Music wire	Music wire	
Quantity	1/IFO = 3 total	2/IFO – 6 total	
