

# Design Specifications for the OMC Suspension

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Property	Value or Description	Comment
Baseplate Dimensions	450 mm x 150 mm x 40 mm	Baseplate only
Payload Mass	6.0 kg	Baseplate plus components
Baseplate Material	Light-weighted aluminum, or fused silica	Baseplate provided by ISC
Baseplate internal modes	First mode > 1000 Hz	Get it above IFO noise minimum and violin mode fundamental
Isolation	Double pendulum, with two stages of blades for vertical isolation	Isolation of a double is estimated to be sufficient, but analysis of baseplate vibration needs to be written down
Solid-body mode eigenfrequencies	0.8-2 Hz	This is a guideline only. Modes involving stretching of the bottom stage wires will of course be higher.
Suspension fiber type	Steel - music wire	
Beam height	101.6 mm +/- 2 mm [4.0 inches] above HAM optics table; 25.4 mm +/- 2 mm [1.0 inch] above baseplate	same as iLIGO ISC table beam height
Suspension structure footprint	TBD	Keep as small as practical, to leave as much room as possible on HAM table for other components
Structure resonances	First mode > 150 Hz	
Suspension structure height	725 mm ?	This is not really a spec that needs to be defined here

Suspension point locations on baseplate	4 points	Along (150mm) width, as close to edges as possible; along length, position points to reduce plate motion (e.g., 22% of length from ends minimizes static deflection)
Suspension point design	TBD	Slots in plate, or pegs inserted in side of plate
Local damping	Active, 6 DOF	Same as IMC
OSEM type	TBD	Probably 'Birmingham OSEMs'
Baseplate positioning & pointing range (DC)	Few hundred microns, few hundred micro-rads	Guesstimate -- what's the IMC control range?
Actuator force spectrum	TBD	Not expected to be critical
Actuator noise limits	TBD	Not expected to be difficult
Optical line of sight/clearance reqs		
Electrical wiring to baseplate	TBD	No., gauge, type, connector type
Accuracy of mechanical pitch and yaw positioning		
Accuracy of mechanical vertical positioning		
Beam dumps on SUS hardware	provide mounting holes on uprights, at beam height	
Mechanical stops for baseplate		