

Overview of pendulum parameter sets of 12/13/06 for TM, ERM and CP

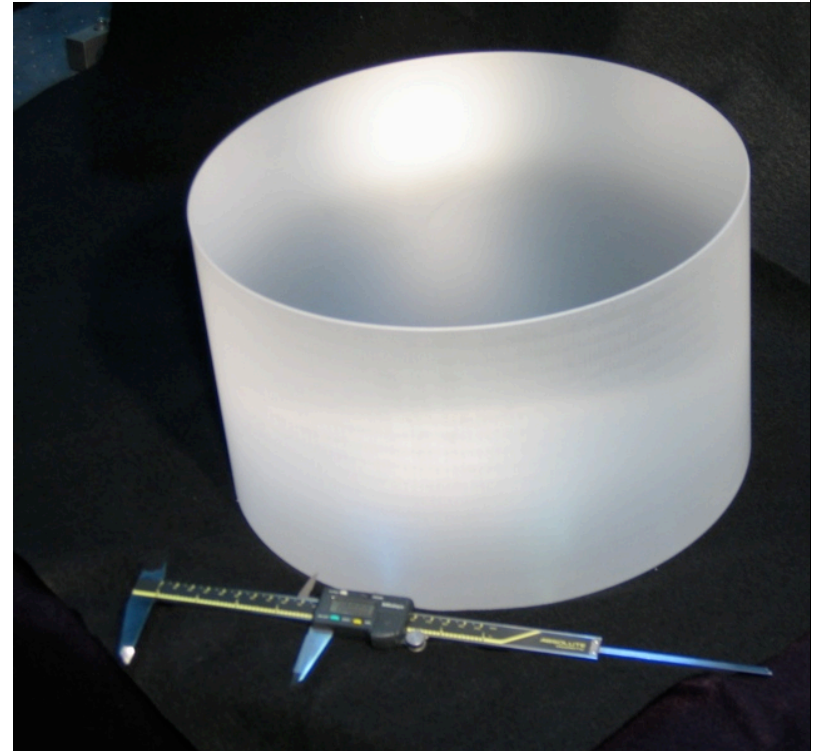
Mark Barton
E2E Meeting
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G070782-00

References

- Parameter sets posted at
 - » <http://www.ligo.caltech.edu/~e2e/SUSmodels/>
 - » Mathematica names: 20061213TM, 20061213ERM, 20061213CP
- Documents:
 - » T060283-02: Note on Design of the ETM Reaction Chain and ITM Reaction Chain in Advanced LIGO (Norna Robertson)
 - » T050077-05: Separation of chains in quad suspensions (Justin Greenhalgh)
 - » T010103-05: Advanced LIGO Suspension System Conceptual Design (Norna Robertson)
 - » M050397-02: Core Optic sizes, including TMs, BS, FM and RM

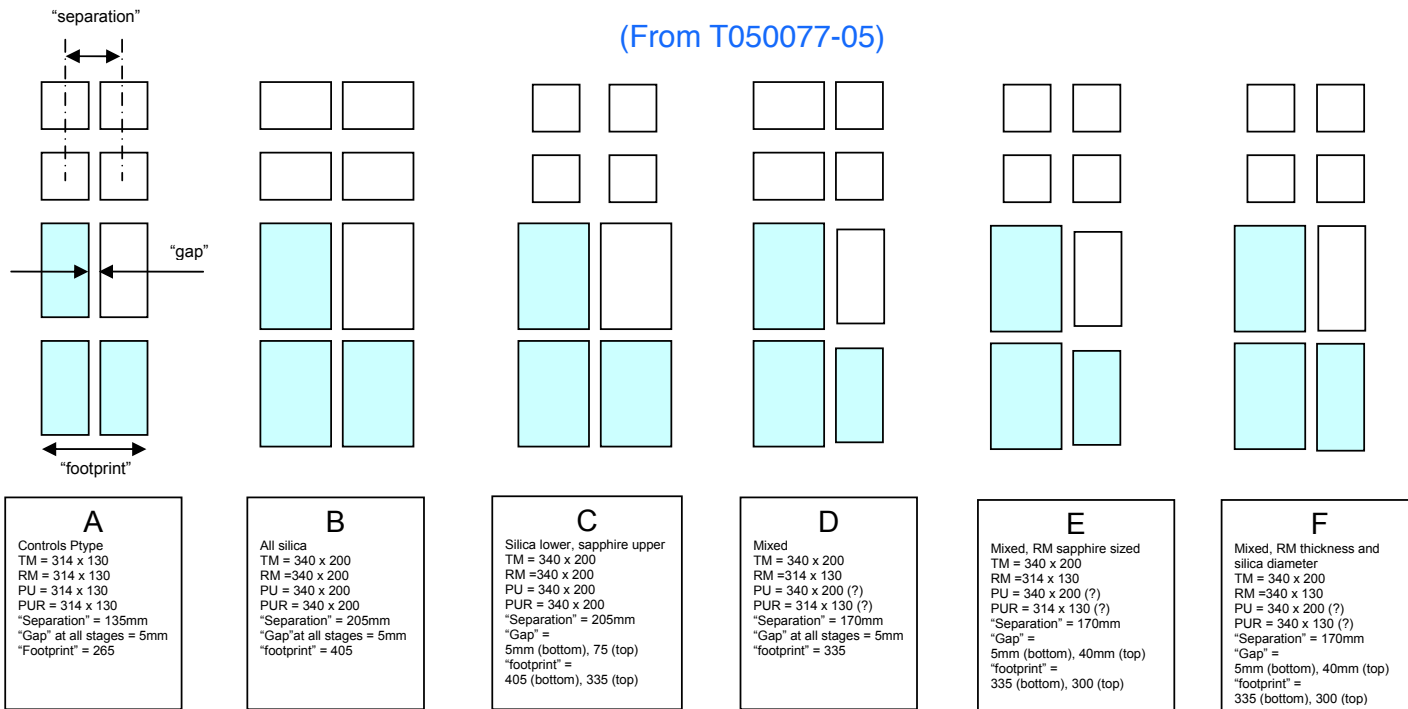
Test Masses

- ETM and ITM chains identical except for minor details like wedge angles
- Silica final and penultimate masses, 39.6 kg each (340 mm diameter by 200 mm thick)
- Metal upper masses, as for controls prototype
- Flats for silicate bonding of ears
- Fused silica ribbons in final stage for lower bounce mode, thermal noise





Reaction Mass Schemes Considered



- Configuration "F" chosen

Reaction Mass Details

- Diameter as for silica test mass (340 mm)
- Thickness as for sapphire (130 mm)
- Dense glass (Schott F2) to make final reaction mass comparable to test mass (44.2 vs 39.6 kg)
- No flats
- Metal penultimate mass with holes to make sum of bottom two masses in each chain the same
- Wires in last stage (not fibres/ribbons)
- Upper masses as for controls prototype (sapphire)

Compensation Plate Detail

- Baseline design now relatively thick (same as reaction mass)
 - » Diameter as for silica test mass (340 mm)
 - » Thickness as for sapphire test mass (130 mm)
- Fused silica, so lighter (26.0 kg)
- No flats
- Metal penultimate mass again with sum of bottom two masses in each chain the same
- Wires in last stage (not fibres/ribbons)
- Upper masses as for controls prototype (sapphire)

Mode Frequency Comparison

- Similar frequencies except highest vertical and roll

TM

longpitch1: [0.3234 0.4392 0.9868 **1.2026**]
longpitch2: [1.5008 1.9869 **2.9339** 3.4112]
yaw: [0.5969 1.3443 2.3972 3.0277]
transroll1: [0.4626 0.8245 1.0445 2.1082]
transroll2: [2.6911 3.3111 5.0980 12.8494]
vertical: [0.5814 2.3376 3.7591 8.9885]

CP

longpitch1: [0.3493 0.4553 0.8575 **1.3536**]
longpitch2: [1.9096 **2.2865 2.9383** 3.4016]
yaw: [0.6519 1.3433 2.3097 2.9810]
transroll1: [0.4802 0.7936 0.8983 2.0413]
transroll2: [2.6977 3.3092 5.0968 20.0025]
vertical: [0.5824 2.3475 3.7738 14.0462]

ERM

longpitch1: [0.3633 0.4371 1.0195 **1.3501**]
longpitch2: [2.0133 **2.7117 3.0147** 3.4146]
yaw: [0.6375 1.4289 2.5243 3.1641]
transroll1: [0.4590 0.7987 1.0791 2.1309]
transroll2: [2.6964 3.3200 5.0985 24.2292]
vertical: [0.5821 2.3460 3.7719 17.0151]

