

Report of the Optics Working Group

Dave Reitze, UF

- Working Session on Sapphire

- » Committee to “down select” AdL test mass material:
 - David Shoemaker (chair), Jordan Camp, Marty Fejer, Sam Finn, Peter Fritschel, Jim Hough, Peter Saulson, Phil Willems
- » near term “priority” action items identified for evaluation
 - Q on large sapphire samples (Glasgow, Caltech)
 - trace element analysis from “Rosetta” sapphire using neutron activation, X-ray fluorescence, EXAFS to correlate absorption data (SUBR)
 - refinement of FFT/Melody analysis of interferometer with adaptive thermal compensation, reasonable distributions for sapphire absorption inhomogeneity (CIT, Stanford)
- » general agreement that shifting “down select” decision to Jan 2003 would allow incorporation of near term action items
 - no hit on critical path

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- Working Session on Coatings
 - » coating stress identified (remembered!) as important loss mechanism
 - coating vendors to provide stress monitor data for all coatings
 - » most work to date focused on fused silica coatings; sapphire coatings need to be looked at!!!
 - » New coating materials materials to be looked at
 - mandated by identification of tantala as 'bad actor' in standard tantala/silica coatings
 - alumina/silica and Niobia identified as good candidates
 - » TNI to look at coating thermal noise

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- Working session on high power
 - » multi-dimensional analysis of parametric instabilities in excitation of TM modes (D'Ambrosia, CIT)
 - sapphire is susceptible
 - » Gingin High Power Test Facility (Jacobs, UWA)
 - coming along nicely; vacuum, electronics in place; optical plant designed
 - » FFT modeling of imperfect core optics (Ganezer, CSDH)
 - analysis of sensitivity impact from mirror deformations
 - » remote test mass sensing (Khazanov, IAP)
 - suite of high sensitivity techniques for heating contamination
 - » high power photodiode development (Jackrel, Stanford)
 - InGaAs, GaInNAs rear-illuminated diodes; 300 mW linearity