Contribution ID: **116** Type: **poster**

Factors pertaining to the strength of four-fiber monolithic silica test mass suspensions.

Tuesday, 24 May 2016 18:00 (0 minutes)

The diameter of the silica fibers used in the 40 kg quasi-monolithic aLIGO test mass suspensions was chosen as d = 400 μm to keep the bounce frequency below 10 Hz, and the violin mode frequencies above 500 Hz. For further improvement of detector performance at low-frequency reducing the vertical bounce mode frequency (linearly proportional to the fiber diameter) would be beneficial. A. Heptonstall et al suggested that the fiber diameter can be reduced to 288 μm; this thickness is sufficient to give a fiber strength three times larger than the static load in aLIGO suspension (still providing a reasonable safety margin). We analyze the strength of welded 4-fiber suspension. The additional factors such as strength of welded joints or stock misalignments may limit the suspension strength. The fiber's thickness is one of the few competitive limiting factors. In such case the fiber's diameter can be made near 300 μm and the full suspension strength should not be significantly affected.

Primary author: Dr TOKMAKOV, Kirill (University of Strathclyde, Glasgow, UK.)

Co-authors: Dr CUMMING, Alan (University of Glasgow); Dr BELL, Angus (University of Glasgow); Dr HAMMOND, Giles (University of Glasgow); Prof. HOUGH, James (University of Glasgow); Dr LOCKERBIE, Nicholas (University of Strathclyde); Mr JONES, Russell (University of Glasgow); Ms ROWAN, Sheila (University of Glasgow)

Presenter: Dr TOKMAKOV, Kirill (University of Strathclyde, Glasgow, UK.)

Session Classification: Poster Session