

**Comparative STEREO-LID (spatio-temporally resolved optical laser-induced damage) studies of critical defect distributions in IBS, ALD, and electron-beam coated dielectric films**

Paper 9632-40

Time: 2:30 PM - 2:50 PM

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[The following paragraph is Sandia's contribution to the above paper]

The HfO<sub>2</sub> thin films produced by e-beam evaporation were deposited in the large optics coater at Sandia National Labs [1]. HfO<sub>2</sub> films were formed by the reactive process of evaporating Hf metal in the presence of oxygen, which was provided by ion-assisted deposition (IAD) and some additional backfilled gas to maintain a total pressure in the coating chamber of 1.1e-4 Torr during deposition. The deposition temperature was 120 °C and the deposition rate was 3 Å/s. The coating system uses planetary rotation and masking to maintain coating uniformity. Quartz crystal monitoring with a single crystal was used for layer thickness control. Prior to deposition, the substrates were cleaned by wiping with alcohol.

[1] J. Bellum, et al, "Meeting thin film design and production challenges for laser damage resistant optical coatings at the Sandia Large Optics Coating Operation," in *Proc. SPIE Laser-Induced Damage in Optical Materials*, vol. 7504, pp. 75041C-1 – 75041C-13 (2009).