Abstract Submitted
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Laser induced damage characteristics of optical thin film with ion assisted planarization and annealing[1] HANCHEN WANG, Physics Department, Colorado State University, Fort Collins, Co 80525, TRAVIS DAY, ELIZBIETA JANKOWSKA, BREANDAN REAGAN, Electrical and Computer Engineering Department, Colorado State University, Fort Collins, Co 80525, JORGE ROCCA, Physics Department, Colorado State University, Fort Collins, Co 80525, CHRISTOPHER STOLZ, PAUL MIRKARIMI, JAMES FOLTA, JOHN ROEHLING, Lawrence Livermore National Lab. (United States) , CARMEN MENONI, Electrical and Computer Engineering Department, Colorado State University, Fort Collins, Co 80525 — Ion beam sputtering growth of amorphous oxides coupled with processing using Ar ion assist is termed *planarization*. This process was introduced by our team reducing defect cross-section on pre-patterned substrates by up to 90% and increasing laser damage performance by 10x The effects of SiO_2 planarization processing on the laser damage resistance of single, bilayers, and multilayer coatings of HfO_2 and SiO_2 is investigated at pulse durations of 9ps and 220ps. Planarized samples experience a large increase in absorption loss at 1m wavelength, which is reduced after in-air annealing suggesting presence of oxygen point defects. It is shown the laser damage threshold reduces with planarized SiO_2 layers directly implemented compared to control samples at both pulse durations. In-air annealing instead shows a recovery of the laser damage threshold.

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