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Laser damage threshold measurement of optical coatings with picosecond pulses from a 1030nm diode-pumped Laser. HANCHEN WANG, TRAVIS DAY, ELZBIETA JANKOWSKA, BRENDAN REAGAN, JORGE ROCCA, CARMEN MENONI, Colorado State University — The damage characteristics and quality control methods of optical coating are of significant interest for all high power laser applications. Of interest is also the study of damage mechanisms for different laser pulse duration. We have developed a set-up to measure damage threshold of optical coatings at a wavelength of 1030nm with 220ps pulse duration. We have measured various samples including single layer HfO2, SiO2 coating, multilayers stacks and the reference fused silica substrate with a single laser shot on each damage site. A high energy diode-pumped, chirped pulse amplification laser was used for the measurement. The laser combines both room temperature and cryogenically cooled Yb:YAG amplifiers with a total of 80mJ, 220ps pulsed output at 20Hz repetition rate. The chirped pulse amplification system also offers control over the pulse duration. Fluence versus damage probability curves for each sample were obtained.

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