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Periscope Design and Testing for Remote Viewing Inside DIII-D[1] J.H. YU, University of California-San Diego, E.M. HOLLMANN, L. CHOUSAL, UCSD — Spectroscopy and imaging are key diagnostics for studying transport and edge physics in tokamaks. However, high neutron flux in environments such as ITER will degrade the performance of optical diagnostics. Optical fibers are particularly susceptible to neutron damage because of their extended length. For example, in existing tokamaks optical fiber damage has been observed for neutron fluences of order 10^{16} cm^{-2}, while ITER is expected to produce a neutron fluence of order 10^{21} cm^{-2}. Thus, optical fibers are not a viable option for remote viewing of ITER, and alternative methods need to be pursued. As part of disruption mitigation studies at DIII-D, we have designed a periscope system comprised of mirrors and a series of Nikon 100 mm f/2.8 camera lenses that relay an image of the plasma viewed through a window flange to a fast-framing CMOS camera detector. We present preliminary measurements of image quality and light throughput of the optical system.

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