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Opto-Mechanical Design of FIR Diagnostic System for C-2W MICHAEL BEALL, B. H. DENG, G. SETTLES, M. ROUILLARD, J. SCHROEDER, H. GOTA, M. THOMPSON, G. SNITCHLER, S. ZIAEI, Tri Alpha Energy, AND THE TAE TEAM — The goal of the C-2W far-infrared (FIR) diagnostic system is to provide highly accurate, simultaneous polarimetry and interferometry information about the generation, equilibrium and time evolution of the advanced beam-driven field-reversed configuration (FRC). Thorough spatial coverage of the confinement vessel will be provided by a set of 14 chords at the central plane, with half of the chords tilted at a 15angle to provide additional polarimetry information. Due to the very low (<.5) Faraday rotation expected in the field-reversed plasma, the system has a design goal of .25 μm maximum allowable vibration over the lifetime of the shot. Due to large eddy-current forces from simulation of magnetic-field ramp-up, a non-metallic canvas phenolic material has been selected for the primary breadboards, which are mounted on a rigid, sand-filled support structure. Given the size of the structure and the magnetic impact, the support structure does not use pneumatic or mechanical isolation. Dynamic vibration analysis with Ansys, based on measurements of local ground vibration and simulations of magnetic forces, predicts that the system will meet the design goal.

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