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Design of an Fiber-Coupled Laser Heterodyne Interferometer for the FLARE SAMUEL FRANK, Univ of Michigan - Ann Arbor, JONGSOO YOO, HANTAO JI, JON JARA-ALMONTE, Princeton Plasma Physics Lab — The FLARE (Facility for Laboratory Reconnection Experiments), which is currently under construction at PPPL, requires a complete set of laboratory plasma diagnostics. The Langmuir probes that will be used in the device to gather local density data require a reliable interferometer system to serve as baseline for density measurement calibration. A fully fiber-coupled infrared laser heterodyne interferometer has been designed in order to serve as the primary line-integrated electron density diagnostic. Thanks to advances in the communications industry many fiber optic devices and phase detection methods have advanced significantly becoming increasingly reliable and inexpensive. Fully fiber coupling a plasma interferometer greatly simplifies alignment procedures needed since the only free space laser path needing alignment is through the plasma itself. Fiber-coupling also provides significant resistance to vibrational noise, a common problem in plasma interferometry systems. This device also uses a greatly simplified phase detection scheme in which chips, originally developed for the communications industry, capable of directly detecting the phase shift of a signal with high time resolution. The design and initial performance of the system will be discussed.

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