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An overview of optical diagnostics developed for the Lockheed Martin compact fusion reactor BRADLEY SOMMERS, ANTHONY RAYMOND, SARAH GUCKER, Lockheed Martin – Palmdale, LOCKHEED MARTIN COMPACT FUSION REACTOR TEAM — The T4B experiment is a linear, encapsulated ring cusp confinement device, designed to develop a physics and technology basis for a follow-on high beta machine as part of the compact fusion reactor program. Toward this end, a collection of non-invasive optical diagnostics have been developed to investigate confinement, neutral beam heating, and source behavior on the T4B device. These diagnostics include: (1) a multipoint Thomson scattering system employing a 532 nm Nd:YAG laser and high throughput spectrometer to measure 1D profiles of electron density and temperature, (2) a dispersion interferometer utilizing a continuous-wave CO2 laser (10.6 μm) to measure time resolved, line-integrated electron density, and (3) a bolometer suite utilizing four AXUV photodiodes with 64 lines of sight to generate 2D reconstructions of total radiative power and soft x-ray emission (via beryllium filters). An overview of design methods, including laser systems, detection schemes, and data analysis techniques is presented as well as results to date.

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