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**Characterization of Aerosol Nonlinear Effects on a High Power CO2 Laser Beam**

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**Abstract:** This report describes a set of aerosol measurements to determine the effect of a countermeasure smoke, **white phosphorus** (WP), on a pulsed high-energy laser (HEL) beam. An analysis of the aerosol (gaseous and particulate airborne material) was used as the basis for calculations of evaporative clearing, and application was made to a given specific test situation. Linear propagation properties forming the basis for the 10.6 micrometers pulsed laser nonlinear effects are obtained relatively directly by using spectrophone absorption and extinction, a light scattering particle spectrometer and nephelometers (particle density as a function of radius and mass loading), and dew-point hygrometer (partial pressure of water vapor). General conclusions are that, for the smoke produced by burning WP, a CO2 pulsed HEL beam clears the optical path quite rapidly and efficiently. The absorption after clearing is caused by the residual vapors and is much lower. (Author)

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