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The Initiation of Optical Breakdown in Simple Liquids KEVIN CISSNER, Air Force Research Laboratories — The probability of breakdown in 40 simple HPLC hydrocarbons and water from a Q-switched laser at 1064 (6ns) and 532 nm (5 ns) was measured using a variety of lenses and cell path length. In each instance a plot of the cumulative distribution function vs. the input laser fluence fits an error-function well, except at low probabilities. Care was taken to measure the light distribution *in sit*u across the entire focal plane. The transmission within the HOMO_LUMO gap was also measure using the long-path-length cells. Trends in the breakdown data with the optical/electronic properties of the target liquids are confounded by spherical aberration. However, the data suggest a connection to the chemical group of the liquid and especially to the C-X bond. In all cases the threshold at 1064 nm is actually less than that at 532 nm. No evidence was found for a mechanism involving dissolved air. A comparison is made to the behavior for static breakdown in gases.

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