

## Optical Pumps for Organic Dye Lasers

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## Abstract

Several types of low energy, ultrafast flashlamps systems have been investigated as optical pumps for lasers using fast decaying fluorescent materials, in particular, organic dyes. Of the various systems examined, the coaxial lamp with a spark gap switch proved to be the most useful for pumping the organic dyes. Parameters optimized were gas type, gas pressure, discharge volume, and electrical circuitry. At optimum operation, the annular volume of the coaxial lamp is completely filled with the discharge and the current rise time is determined mainly by the external circuit inductance. The rapidity and uniformity of the discharge is attributed to photoionization of the gas fill. Current rise times are typically 140 nsec for energies up to 100 J. Because of the photoionization process, these coaxial lamps are considered to be a different class of flashlamps from the standard capillary discharge lamp, the sliding spark lamp, and the ablating wall lamp. Less useful systems that were investigated are described, and the reason for their deficiencies are analyzed.

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