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This Week's Citation Classic

Snavely B B. Flashlamp-excited organic dye lasers. *Proc. IEEE* **57**:1374-90, 1969. [Eastman Kodak Research Laboratories, Rochester, NY]

The excitation threshold and wavelength tuning range of the dye laser are discussed by considering the optical gain, derived from rate equations, of a dye solution for which the emission and absorption spectra of singlet- and triplet-state transitions are known. [The *SCI*® indicates that this paper was cited over 120 times since 1969.]

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"In the years immediately following the invention of the laser, its potential for application to the study of a broad class of physical and chemical problems was perceived by many people. However, the use of early lasers in these studies was severely constrained by the limited number of available wavelengths. In 1966 P. P. Sorokin[1] and, independently, F. P. Schafer,[2] demonstrated that stimulated emission of broadly variable wavelength could be obtained from fluorescent dyes. This work attracted widespread attention from atomic physicists, spectroscopists, and photochemists. Interest was heightened by the demonstrations of flashlamp-excited dye lasers, again by Sorokin and by Schafer, the use of a dispersive intracavity element to tune the laser, by B. H. Soffer and B. B. McFarland,[3] as well as the extension of the dye laser operating wavelength to the blue region of the spectrum by my colleagues and myself at Kodak.

"In the late 60s there were relatively few laboratories working on the device itself. Fruitful research on the laser required the interaction of a broad range of disciplines including optics, molecular spectroscopy and, most important, dye chemistry. The necessary combination of talents was found in only a few chemical or physical laboratories.

"Shortly after his initial dye laser experiments, Sorokin made Otis Peterson and me aware of the nearly unique capability of the Kodak Research Laboratories to do the basic studies needed to understand some of the peculiarities of the dye laser. We were fortunate to have access not only to the outstanding dye chemists at Kodak but also to a collection of well-characterized dye samples representing many classes of compounds. We were, therefore, very quickly able to systematically study laser properties.

"My review paper was published at a time when interest in the dye laser had been aroused, but most publications on the device were letters or short, specialized articles. In considering the basis for the relatively frequent citation of this paper, I would suggest that in it the physical bases for some of the characteristics peculiar to the dye laser were reviewed for the first time. Early results which led to the development of the CW dye laser in our laboratory were also laid out for the first time.

"The paper was written in response to an invitation from A. E. Siegman and was completed while I was working in the laboratories of H. Kuhn and Schafer at the University of Marburg. The paper benefited greatly from interaction with them. Kuhn made possible the nine-month appointment at Marburg along with its subsequent impact on this paper and on my own work in tunable lasers."

REFERENCES

1. **Sorokin P P & Lankard J R.** Simulated emission observed from an organic dye, chloraluminum phthalocyanine. *IBM J. Res. Develop.* **10**:162-3, 1966.
2. **Schafer F P, Schmidt W & Volze J.** Organic dye solution laser. *Appl. Phys. Lett.* **9**:306-9, 1966.
3. **Soffer B H & McFarland B B.** Continuously tunable, narrow band organic dye lasers. *Appl. Phys. Lett.* **10**:266-7, 1967.