Solid State Lasers

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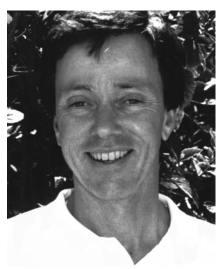
Progress in the development of solid state lasers has come at an ever increasing rate in recent years. As improved solid state laser materials and higher quality nonlinear optical crystals have become available, advances in the range and scope of solid state lasers has continued to expand. In many cases these advances owe their success to the ongoing development of efficient laser diode pump sources. The variety of wavelengths and output power currently available from high-power pump laser diodes is unprecedented. And fueled by such applications as medical, industrial, military, and law enforcement, the growth in solid state laser research and development has outpaced growth in virtually every other traditional laser type.

I am pleased to be able to introduce this special section on Solid State Lasers. In the few short months that were available between the announcement of the special section and the publication deadline, six papers were reviewed in time to be presented in this issue of Optical Engineering. These papers represent a sampling of the active research that comprises modern solid state laser development. Two papers are related to laser *Q*-switches. The paper by Raevsky and Pavlovitch describes the use of a *Q*-switch for high average power laser operation, while the paper by Gu et al. discusses the performance of a Nd:YAG laser incorporating a GaAs passive *Q*-switch. Nonlinear optics is the focal point of the paper by Liu and Nagashima, in which tunable blue light is generated by second harmonic generation of a Cr:LiSAF laser. Nonlinear optics are also central to the paper by Jaque, Capmany, and Gárcia Solé in which red, green, and blue light are generated from a Ti:sapphire laser-pumped NYAB laser. A novel design for a femtosecond laser is described by Li et al. in which a single prism in combination with a wedge mirror is used for group velocity dispersion compensation. The paper by Pavel and Taira describes a model for fiber-coupled diode-pumped lasers in which the M^2 factor of the pump beam is used to obtain the optimum pump focus conditions. This ensures minimum threshold power and maximum pump-beam to resonator-mode matching.

The area of solid state laser development is among the most important contemporary topics in laser development for both commercial and custom applications, and I hope that you will both enjoy the papers and find them useful for your technical endeavors.



Richard Scheps is Head of the Electro-Optics Branch at the Space and Naval Warfare Systems Center, San Diego. He received his BS degree from the University of California at Berkeley and his PhD from the University of Chicago. He performed postdoctoral research in atomic and molecular physics at the Joint Institute for Laboratory Astrophysics in Boulder, CO. Prior to coming to the Space and Naval Warfare Systems Center he worked in both industry and university laboratories. He is actively involved in laser research and development and his interests also include the study of kinetics and spectroscopy of optically excited crystals. He has published extensively on the development of up-conversion lasers, dye lasers, semiconductor laser diodes, excimer lasers, and tunable solid state lasers, and holds over twenty patents in the field of lasers and electro-optics. In recent years his work has emphasized laser diode-pumped IR and visible solid state lasers. He is currently Associate Editor of the IEEE *Journal of Quantum Electronics* and has been active in the organization of laser-related conferences sponsored by SPIE, IEEE, and OSA. He currently serves as Chair for the SPIE International Symposium LASE 2000, High-Power Lasers and Applications.