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Studies on spectral stability of a tunable dye laser

Nageshwar Singh
Raja Ramanna Centre for Advanced Technology, India

The technique of making tunable dye laser involves various technological challenges, including tailoring the properties of light according to the specific needs. Many practical applications require high output average power, good beam quality and, more importantly, spectral (wavelength and bandwidth) stability. Broadly tunable dye laser has created profound impact on various fields. Development of such tunable laser sources, catering to ever-demanding spectroscopic applications, is a very active field of research. Therefore, issues related to spectral stability of a narrow bandwidth high repetition rate dye laser are investigated. Succinct review on a complete dye laser system starting from gain medium characteristics, resonator, and excitation sources and other issues from microscopic to macroscopic levels associated with the high repetition rate are discussed. More specifically, it looks at the effects of high repetition rate excitation on the stability of the laser characteristics. For these purposes, novel diagnostic technique for large scale data acquisition, its presentation, and its precise measurements are formulated and effectively executed to explore the dye laser short/long-term spectral stability. These studies have brought out technologically advanced and highly stable high repetition rate and narrow bandwidth tunable dye laser suitable for its potential applications. A brief assessment of present state-of-art technological advancement in the field of other tunable laser sources is also presented.

Biography

Nageshwar Singh after completing his Master of Science joined the Raja Ramanna Centre for Advanced Technology, Indore, India, as a scientific officer. He has completed his PhD in Dye Laser. He was involved in the physics and technology development of high-repetition-rate, broadly tunable, narrow-bandwidth dye laser. In the last ten years, he has published more than 30 papers in various reputed peer reviewed journals and 30 papers in the proceedings of various national/international conferences. His other research interests include materials optical properties in Terahertz region. He is a reviewer of reputed journals and a member of Indian Laser Association.

nageshwar@rrcat.gov.in