

Abstract of PhD thesis

“Multi process control, real-time data acquisition and analysis system for chemical oxygen iodine laser”

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Data acquisition and control system (DACS) plays a major role in the development of gas laser in general and Chemical Oxygen Iodine Laser in particular. In view of the non-availability of detailed literature relevant to this laser, various countries have embarked on their own laser programs for solving the technological gray areas from the point of view of practical applicability of this laser. One of the most critical aspects for optimum laser operation and characterization is the development of an advanced, dedicated Data Acquisition and Control System. The research and development activity in this field demands a special custom-built DACS which not only meets the on line operational requirements but also special diagnostics and analysis system for thorough understanding of the laser. Further, it is essential to develop an R&D system, incorporating a fair magnitude of flexibility from the viewpoints of functionality, parameter monitoring, acquisition, diagnostics, safety interlocks and performance analysis. In order to fulfill these features the developed DACS should be capable of being operated by a single person and should also have user's friendly features with necessary graphical user interfaces. Thus a flexible, modular and multipurpose real time data acquisition and control system has been designed, developed, implemented and performance tested under this present research work. An entire methodology for developed system has been presented in the thesis.

The developed system has been interfaced with the chemical oxygen iodine laser for successful laser power firing. A number of experiments have

been carried out for analyzing the performance of this laser. The different subsystem like BHP supply system, iodine supply system, chlorine feed system, singlet oxygen generator, gas feed system, diagnostics system and safety system are tested for their parametric and operational performance.