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Chemical oxygen iodine laser: technical overview and future potential

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As the only true electronic transition chemical laser the Oxygen Iodine Chemical Laser (COIL) has found great attention in the international R&D community with respect to high brightness applications. A brief outline of the history of COIL development will be given while introducing the major processes that characterize the physico-chemical properties of the laser. In particular, the crucial importance of the generation of $O_2(^1\Delta)$ molecules on the overall performance will be demonstrated and the current understanding of the basic processes in the liquid phase of BHP (basic hydrogen peroxide) will be reviewed.

Special attention will be given to advanced generator concepts recently introduced by Russian work.

Limitations due to excited Oxygen quenching and open questions related to Iodine mixing and dissociation will be addressed in a comprehensive discussion of the laser power optimization.

Pulsed operation of otherwise CW COIL has implications for high power short wavelength generation. This aspect will be included in a preliminary evaluation of the future application potential of COIL.