

## Random lasers: 30 years of development

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In this report an overview of random lasers development is presented starting from the first theoretical prediction of random laser action by Letokhov about 50 years ago and the first experimental demonstration by Markushev et al 30 years ago. It includes technological aspects of random lasers on granular powders and porous semiconductor templates. Peculiarities of random laser action from lanthanide doped powders as well as random lasers with coherent and incoherent feedback from ZnO powders and nanostructures are discussed. Advantages of random lasers with separated scattering and gain media are analyzed. Possibilities to realize random laser action in porous dielectric and semiconductor templates doped with rear earth and transition metal ions is demonstrated. Peculiarities of electrochemical technologies for preparation InP, GaAs, GaP, Al<sub>2</sub>O<sub>3</sub> and TiO<sub>2</sub> templates and their doping with impurities relevant for laser action are discussed. Prospective applications of random lasers in displays and lighting technology, environment-sensitive devices, such as gas sensors and switches depending on humidity and/or partial gas pressure, identification of friendly/enemy vehicles, encoding devices and X-ray and  $\gamma$ -ray lasers, working in spectral regime in which reflective elements are not available are reviewed.

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