

Cooperative luminescence and superfluorescence in nanoclusters

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Abstract

The processes of cooperative luminescence and superfluorescence (SF) in nanoclusters, which consist of a few neighbor particles, interacting with each other by exchange or/and electrostatic forces, are investigated theoretically. It is shown that there are two types of cooperative SF depending on the ratio between the linear size of a nanocluster and cooperative interaction range. The experiments on cooperative luminescence in Ytterbium-doped silica fibers are analyzed. It is shown that the intensity of cooperative SF in such a system should be proportional to the forth degree of Ytterbium concentration.

<http://dx.doi.org/10.1117/12.801746>

Keywords

Cooperative processes, Fiber, Nanoclusters