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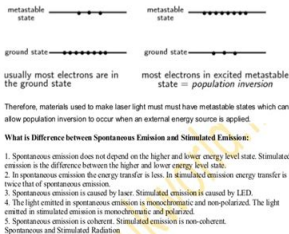


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so many fake sites. this is the first one which worked! Many thanks



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1st Year Engineering Physics Notes Semester

Laser Action

Interaction of electromagnetic radiation with matter produces absorption and spontaneous emission. Absorption and spontaneous emission are natural processes. For the generation of laser, stimulated emission is essential. Stimulated emission has to be induced or stimulated and is generated under special conditions as stated by Einstein in his famous paper of 1917, i.e. "when the population increases evenly between upper and lower levels among atomic systems, it is possible to produce amplified stimulated emission and the stimulated emission has the same frequency and phase as the incident radiation". Einstein combined Planck's law with Boltzmann's statistics in formulating the concept of stimulated emission. In electronic, atomic, molecular or ionic systems the upper energy levels are less populated than the lower energy levels under equilibrium conditions. Pumping mechanism excites say, atoms to a higher energy level by absorption.

The atom stays at the higher level for a certain duration and decays to the lower stable ground level spontaneously, emitting a photon, with a wavelength decided by the difference between the upper and the lower energy levels. This is referred to as natural or spontaneous emission and the photon is called spontaneous photon. The spontaneous emission or fluorescence has no preferred direction and the photons emitted have no phase relations with each other, thus generating an