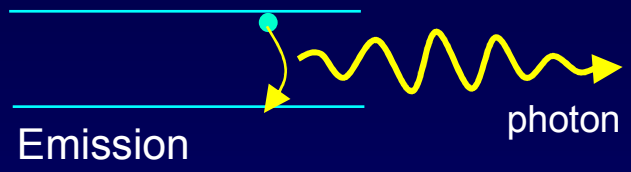
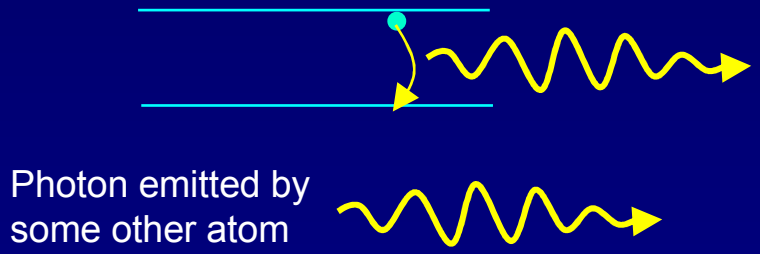
Lasers

Suppose we have an atom in an excited state. Eventually (at some random time) it will emit a photon and fall to the lower state. The emitted photon will go in a random direction. This is called "spontaneous emission".



Suppose, however, that before the spontaneous emission occurs, another photon of the same energy (emitted by another atom) comes by.
Its presence will stimulate the atom to emit its photon.



Stimulated emission

We now have two photons in the same quantum state:
the same frequency, the same direction, and the same polarization.
As they travel, they will stimulate even more emission.