# Coherent population inversion in a four-level scheme

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Coherent population transfer or inversion in multilevel atomic systems interacting with laser lights is a very interesting phenomenon in quantum optics. The phenomenon has a possibility preparing atoms in a desired level, so that it can be a powerful tool in various parts such as the efficient photoionization, the collisional dynamics and the spectroscopy studies, and the coherent atomic beam manipulation. The inversion dynamics in three-level systems was well studied [1,2]. In this study, we focus our attention on the coherent population inversion in a four-level system to find conditions of the lasers and the atom under which the inversion is complete. That is, we give the conditions to invert the system, whose ground state consists of two bound-levels, completely into an excited state. This found conditions may be hepful information for the studies of the various parts as described. In particular, highly efficient photoionization and coherent atomic beam manipulation which is a central problem for atomic interferomter will be good candidatures.

[1] A. S. Choe and J. Lee, J. Korean Phys. Soc. **30**, 144 (1997).
[2] N. V. Vitanov and S. Stenholm, Optics comm. **135**, 394 (1977).