

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Spooky Phenomena in Two-Photon Coherent Atomic Absorption**

MING-CHIANG LI, Liceimer — Physical processes on two-photon coherent atomic absorption of multiple laser beams were discussed more than twenty five years ago. These processes can be divided into two distinct groups. In the first group, laser beams are from a single source<sup>1,2</sup>, and in the second group laser beams are from two different sources<sup>3</sup>. Several experiments in the first group were carried out and have led to the 2005 Nobel Prize in physics. The second group is more interesting. Atoms are in random motion and two photons are from different sources. Classically, it is impossible for atoms to transit coherently in the absorption process, but quantum mechanically, such a transition is possible and that is one of the spooky phenomena in quantum mechanic. To assure the coherent transition, each photon as absorbed by the atom must have two possible paths of choices. If one photon has the choice and other one is not, then the atomic transitions cannot be coherent. The present talk will review various spooky phenomena associated with two-photon coherent atomic absorption, and will clarify some theoretical misunderstandings regarding these interesting transitions. Reference:

1. M. C. Li, *Nuovo Cimento* **39B** (1977) 165.
2. M. C. Li, *Phys. Rev. A* **16** (1977) 2480.
3. M. C. Li, *Phys. Rev. A* **22** (1980) 1323.

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Date submitted: 25 Dec 2005

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