

Birefringence lens effects of atom ensemble enhanced by electromagnetically induced transparency

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We study the optic control for birefringence of a polarized light by an atomic ensemble with a tripod configuration, which is mediated by the electromagnetically induced transparency with a spatially inhomogeneous laser. The atom ensemble splits the linearly polarized light ray into two orthogonally-polarized components, whose polarizations depend on quantum superposition of the initial states of the atom ensemble. Accompanied with this splitting, the atom ensemble behaves as a birefringent lens, which allows one polarized light ray passing through straightly while focus another orthogonal to this polarization with finite aberration of focus.

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