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**Phase Manipulating Refractive Index from Positive to Negative in a Four-level Atomic System** HONGJUN ZHANG, Institute for Quantum Science and Engineering and Department of Physics and Astronomy, Texas A&M University, College Station, TX, 77843, USA — We propose a four-level loop atomic scheme based on quantum coherence. Electric and magnetic responses of the medium to the probe field are discussed by taking into account the relative phase of the applied fields. It is shown that a change of the refractive index from positive to negative can occur by modulating the relative phase of the applied fields under suitable conditions. Then the medium can be switched from positive-index material to negative-index material or vice versa. In addition, a negative index material can be realized in different frequency regions by adjusting the relative phase.

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