Magnetically Induced Transparency in Cold Magnetized Plasma by Spatially Periodic Magneto-static Field

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Electromagnetically Induced Transparency (EIT) is widely investigated. [1] EIT is a resonance absorption line made transparent due to destructive interference between two atomic transitions. A classical analog to quantum EIT is cold magnetized plasma, which resonantly absorbs electromagnetic radiation at the electron cyclotron frequency. Transparency is induced in such plasma by an additional magnetic field, constant in time and varying in space. [2] The proposed physical mechanism is the coupling of longitudinal plasma modulation to the transverse components of the electromagnetic radiation, canceling the forces acting on the plasma electrons. The plasma frequency and the electron cyclotron frequency are the classical analog of the atomic transition frequencies in quantum EIT. Controllable wave propagation parameters such as transmission amplitude and group velocity are some inherent features of MIT. Theoretical study and experimental results will be presented.