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**Coherent manipulation of absorption by intense fields in four level ladder system** PARDEEP KUMAR, SHUBHRANGSHU DASGUPTA, Department of Physics, Indian Institute of Technology Ropar — Nonlinear optical processes attributed to the dependence of the susceptibility of the medium on the input fluence can be remarkably manipulated by the quantum interference and coherence. One of these processes, the optical bistability (OB), that refers to the possibilities of two stable outputs for the same input fields, can also be modified by quantum coherence. Further, the nonlinear dependence of the absorption on the power of the input light gives rise to interesting processes like saturable absorption (SA) and reverse saturable absorption (RSA). While the SA corresponds to the decrease in the absorption coefficient with the increase of intensity of input light, the RSA corresponds to otherwise, that finds applications in optical limiting. We show, using a four-level Ladder system, how a control field manipulates these processes for an intense probe field applied in the excited state transition. The nonlinear absorption increases whereas the threshold of OB decreases in presence of a control field. We further delineates how the control field and the decay rates modifies SA and RSA. The control of these processes find applications in optical switching, optical limiting and optical communications.

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