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## Effects of Gold and Silver Nanoparticles on Optical Bistability of Titanium Dioxide Nanocolloid

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In this study, titanium dioxide (TiO<sub>2</sub>) nanocolloid was synthesized through sol–gel method, and non-linear optical properties were studied using z-scan method. The refractive index and other non-linear optical properties of the nanomaterials were measured using z-scan technique. Also, a Fabry–Perot interferometer was utilized to explore the changes of output intensity from the colloid by using of optical bistability setup. The radiated power to the resonator was elevated till 20 mW for laser beam with the same spot size. Hysteretic loops have been observed due to optical bistability of the TiO<sub>2</sub> nano-composites and results were perfectly fitted with theoretical curves. Experiments were repeated for Au and Ag nanocolloid and also the mixture of the TiO<sub>2</sub> and metal nanocolloids. Meaningful amplification in non-linear refractive index, absorption coefficient, and bistable response of the mixture occur due to plasmon resonance of metal nanoparticles.

**Keywords:** non-linear optics, optical bistability, titanium dioxide nanoparticles, silver and gold nanoparticles.