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Utilizing nonlinear optical properties in nanoparticles for imaging[1] BRIAN YUST, NEEMA RAZAVI, DHIRAJ SARDAR, The University of Texas at San Antonio — Optical phase conjugation is a nonlinear effect in which light incident upon a nonlinear medium may be conjugated so that the output signal is in the opposite direction of the input, as seen in four-wave mixing. Recently, we have seen that these nonlinear effects may still be seen in various nanocrystals and nanoparticles. Barium titanate (BaTiO3) is a good candidate for phase conjugation on the nano-scale, because of its large third order susceptibility. BaTiO3 particles of varying size are synthesized through precipitation and hydrothermal methods and analyzed optically and morphologically. The nonlinear absorption, four wave mixing signal in the forward and counter-propagating geometries, and third order susceptibilities are characterized in both the visible and infrared. Possible uses for the unique optical properties of these nanoparticles in imaging, microscopy, and photonics will also be discussed.

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