

Abstract Submitted
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Optical limiting and nonlinear optical properties of gold-decorated graphene nanocomposites RAMAKRISHNA PODILA, Clemson University, PRABIN PRADHAN, MURALIKRISHNA MOLLI, Sri Sathya Sai Institute of Higher Learning, ADARSH KANIYOOR, Indian Institute of Technology Madras (IITM), SAI MUTHUKUMAR V, S. SIVA SANKARA SAI, Sri Sathya Sai Institute of Higher Learning, S. RAMAPRABHU, Indian Institute of Technology Madras (IITM), APPARAO RAO, Clemson University, DEPARTMENT OF PHYSICS, SRI SATHYA SAI INSTITUTE OF HIGHER LEARNING TEAM, ALTERNATIVE ENERGY AND NANOTECHNOLOGY LABORATORY (AENL), INDIAN INSTITUTE OF TECHNOLOGY MADRAS TEAM, DEPARTMENT OF PHYSICS AND ASTRONOMY, CLEMSON NANOMATERIALS CENTER, CLEMSON UNIVERSITY TEAM — Although metal nanoparticle-decorated nanomaterials exhibit excellent optical limiting (OL) performance at a relatively higher fluence ($>9 \text{ J/cm}^2$), there is a dearth of OL materials for protecting low damage threshold ($<1 \text{ J/cm}^2$) photonic devices. The rehybridization of some metal d -orbitals and graphene p -orbitals often leads to undesirable changes in graphene's electronic structure, which adversely affects OL. Here, we demonstrate that d -orbitals of Au nanoparticles exhibit little or no rehybridization with graphene, and result in an enhanced OL behavior even at a low fluence of $\sim 0.4 \text{ J/cm}^2$ due to the excellent photo-absorption of Au combined with rapid carrier thermalization by graphene.

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