

Abstract Submitted
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A New Series of Donor-Acceptor Substituted Small Organic Molecules With Large Third Order Molecular Polarizability MARTEN BEELS, Lehigh University, IVAN BIAGGIO TEAM¹, FRANCOIS DIEDERICH COLLABORATION², MELANIE CHIU COLLABORATION³ — We report on the third-order nonlinear optical properties of a series of new small organic molecules with a non-planar structure. A large third-order molecular polarizability is achieved thanks to a lower excited state energy obtained due to donor-acceptor substitution. We determined the influence of variations in the donor-acceptor substitution pattern and relate them to the nonlinear response by modeling the molecular properties computationally, and by experimentally determining the rotational average of their third-order polarizability by degenerate four-wave mixing. We found that the best molecules are extremely efficient both in relation to their size and to the fundamental quantum limit. These molecules show great potential for applications where the molecules are combined into dense supramolecular solid state assemblies in the form of high optical quality thin films obtained by molecular beam deposition.

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