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Intramolecular Interactions in Novel Macrocyclic Materials THEODORE GOODSON, University of Michigan — In this presentation I will report a strongly interacting new dendrimer system with an extended spectroscopic unit (coherent domain) beyond the trimer configuration. Strong cooperative enhancement of two-photon absorption cross-section was observed when going from the trimer arrangement to the next generation. Combination of a variety of femtosecond spectroscopy methods such as femtosecond time-resolved fluorescence upconversion, transient absorption, transient grating, three pulse photon echo peak shift experiments complemented with those of steady state spectroscopy allowed us to compare the properties of absorption states with those of fluorescence states, to estimate the reorganization energies, and the extent of inhomogeneous broadening. Our measurements indicated that spectroscopic unit (domain) is different for the trimer system and for the dendrimers of higher generation numbers. This coherent domain extends over the trimer geometry and its size is comparable with the size of the dendrimer G1 comprising nine linear segments. We have also investigated the novel applications of a two-dimensional carbon network structure's building blocks. The material shows very interesting two-photon absorption properties as well as strongly coupled optical excitations. They have also been suggested as good building blocks for molecular electronics applications.

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