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Exciton Spectra of Two-Dimensional Semiconducting Carbon Structures SHOUTING HUANG, YUFENG LIANG, LI YANG, Department of Physics, Washington University in St. Louis — We employ the first-principles GW-Bethe-Salpeter Equation (BSE) approach to study excitonic effects on optical absorption spectra of several newly discovered two-dimensional (2D) semiconducting carbon structures. Unique exciton spectra are observed, in which the order of exciton energies and degeneracies are qualitatively different from those of bulk semiconductors. We propose a modified hydrogen-like model that clearly explains their exciton spectra. Our modeling effort gives rise to a convenient way to understand excitonic spectra and estimate the exciton binding energy of 2D semiconductors.

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