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Comparing the Inner and Outer Double-resonance Raman Scattering Processes in Bilayer Graphene DANIELA MAFRA, Universidade Federal de Minas Gerais, ELIE MOUJAES, RICARDO NUNES, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil., STEVEN DOORN, HAN HTOON, Chemistry Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545, USA., MARCOS PIMENTA, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil. — The Raman spectroscopy has been widely used to study carbon materials. In this work the dispersion of phonons and the electronic structure of graphene systems can be obtained experimentally from the double-resonance (DR) Raman features by varying the excitation laser energy. The electronic structure was analyzed in the framework of the Slonczewski-Weiss-McClure (SWM) model, considering both the outer and inner DR process and the SWM parameters was obtained for each model. We show that the parameters obtained when we consider the inner DR process are in better agreement with those obtained from other experimental techniques, despite the fact that several previous studies about the DR process in graphene usually pay attention solely to the one-dimensional outer (DR) process. This result possibly shows that there is still a fundamental open question concerning the double resonance process in graphene systems.

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