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Exciton Phonon Coupling and G-Band Resonance Observed by Photoluminescence Spectroscopy in Single Walled Carbon Nanotubes FLAVIO PLENTZ, HENRIQUE RIBEIRO, CRISTIANO FANTINE, MARCOS PIMENTA, ADO JORIO, Universidade Federal de MInas Gerais, MICHAEL STRANO, University of Illinois at Urbana - Champaign — One dimensional systems, such as Single Walled Carbon nanotubes (SWNT), show very interesting optical properties. For certain values of energies, the gradient of $E(\vec{k})$vanishes and the density of states (DOS) diverges. These are known as van Hove Singularities (VHS). In the case of SWNT's that are semiconductors, efficient photoluminescence (PL) can be observed when they are isolated in stable suspensions by the use of surfactants or wrapped by macromolecules such as DNA. In semiconducting SWNT's excitonic effects are very strong and binding exciton energies up to 1eV are expected. For that reason it is expected that excitonic effects dominate the processes of absorption and emission of light. In this case resonant behavior of the PL is observed when the excitation energy matches the excitonic bound states associated with each vHS. In SWNT's strong exciton-phonon coupling is also expected due to de 1D character of the system. In this work we performed PLE measurements in surfactant-suspended SWNT's using laser energy from 1.20eV to 1.75eV and measuring emission from 0.8eV to 1.45eV. Several already observed resonances were measured and allowed us determine which tubes are in the sample. Phonon-assisted PL were also observed crossing all over the map and are identified as originating from exciton-phonon coupling SWNT's. The brazilian authors acknowledge CNPq, FINEP and FAPEMIG

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