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1st and 2nd order Raman scattering from n-Graphene Layer (nGL) Films on Silicon Substrates. AWNISH GUPTA, GUGANG CHEN, PETER EKLUND, Department of Physics, The Pennsylvania State University — Results of room temperature Raman scattering experiments on graphene and n-graphene layer films (nGLs) will be presented [1]. We find that the G band at $\sim$ 1582 cm-1 exhibits an interesting upshift in frequency with 1/n which we tentatively assign to a surface strain phenomenon connected with surface roughness of the substrate and compensated by the increase in stiffness of the nGL with increasing n. Interesting n-specific bands are observed in the $\sim$1350 cm-1 (or D-band) region which may correlate with deviations from planarity of the nGL. The second order scattering is very interesting and for small n (n<4) the (2D' or G') band intensity at $\sim$ 2700 cm-1 is actually higher than the first-order G-band scattering. The shape of this band is sensitive to n and thus can be used to identify n without an AFM measurement. Whereas, the 2D' band is sensitive to n, the 2nd order 2G band $\sim$ 3248 cm-1 is independent of n. These observations will be discussed in terms of the phonon and electronic dispersion of nGLs. 1 A. Gupta, G. Chen, P. Joshi, S. Tadigadapa and P.C. Eklund, " Raman Scattering from High-Frequency Phonons in Supported n-Graphene Layer Films" NanoLett (in Press).

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