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Micro-Raman Spectroscopy of Atomically-Thin Graphite[1] KEVIN MEAD, JOHN HASSLINGER, JEFF SIMPSON, Towson University — The unique linear energy vs. momentum relationship leads to interesting fundamental physics including massless particles studied in quantum electrodynamics, a unity tunneling paradox, and an anomalous quantum Hall effect. We will use mechanical exfoliation of highly-oriented pyrolytic graphite (HOPG) to produce single and multilayer graphene flakes on $Si/S0_2$ substrates. We will analyze the graphene using a combination of microscopy techniques including optical, micro-Raman spectroscopy, and atomic force microscopy (AFM). The Raman spectra exhibit phonon modes common to graphitic carbon, specifically known as the D, G, G'$_{2D}$. Fitting the peaks with Lorentzian(s) quantifies the number of graphene layers. The peak frequency and intensity of Raman modes provides information about electron-phonon coupling and defects. We compare the Raman spectra of graphene prepared using mechanical exfoliation and CVD growth, both in contact with and suspended above substrate surfaces. Additionally, we will correlate Raman spectral maps with AFM topological contours.

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