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Effect of Laser Irradiation on Structural and Electronic Properties of Single-layer and Bi-layer Graphene PUBUDU GALWADUGE, JOSEPH LAMBERT, ROBERTO RAMOS, Drexel University — Graphene is a two-dimensional crystal with remarkable electronic properties which have made it a component of interest in fabricating chemical sensors, superconducting devices and room-temperature transistors. Fabrication and metrology techniques typically use energetic beams such as lasers which are likely to induce unintentional changes in graphene. We report results of Time-Resolved Raman Spectroscopy experiments that investigate the effect of low,medium, and high power laser irradiation on the structural and electronic properties of single-layer and bi-layer graphene. We have irradiated graphene using a 514.5nm laser at power levels of 1.8mW, 9mW and 18mW. Changes in electronic and structural properties were observed by observing the time evolution of the Raman D and G bands. Under irradiation at 1.8mW and 9mW, single layer graphene flakes show changes in charge carrier concentration. Under irradiation at 18mW,single layer graphene shows signs of defect formation and breakdown into nano-crystalline graphene. Bi-layer graphene shows no measurable changes in the Raman D and G bands under irradiation at 9mW.

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