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Graphene on a curved substrate with a controllable curvature: Device fabrication and transport measurements YIXUAN CHEN, SHAUN MILLS, YING LIU, Pennsylvania State University — In monolayer graphene, the local deviation of carbon positions from the perfect lattice has been predicted to lead to a pseudo magnetic field with measurable effects. A striking confirmation of this effect is the observation of Landau levels that are attributed to a pseudo magnetic field in excess of 300 T in graphene nanobubbles. However, typical experimental methods of generating such local deviations in graphene rely on strain accompanied by a surface curvature. Whether a surface curvature alone can produce measurable effects in graphene has not been explored experimentally. It is therefore of interest to study graphene in a system that decouples strain from surface curvature. Of particular interest is its response to an external magnetic field. We developed a grayscale electron beam lithography technique for preparing PMMA substructures with a continuously variable radius of curvature from ∼100 nm to ∼1 μm. Magnetoelectrical transport measurements on exfoliated graphene supported by these substructures are being carried out. The flexibility of this process may be further exploited in the study of the bilayer and trilayer graphene systems. We will also study hybrid structures of 2D superconductors and graphene.

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