Abstract Submitted
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**Demonstration of Persistent Optical Gating Effect in $MoS_2$ and Graphene**[1] ERZSEBET C. VINCENT, ANDREW L. YEATS, PETER J. MINTUN, KAN-HENG LEE, Institute for Molecular Engineering, University of Chicago, HUI GAO, Department of Chemistry, University of Chicago, JIWOONG PARK, DAVID D. AWSCHALOM, Institute for Molecular Engineering, University of Chicago — Two-dimensional layered materials (2DLMs) offer a wide range of emergent properties beyond those of the bulk species, making them attractive for novel technologies. One important example is the direct modulation of the electrical and other physical properties of 2DLMs using their strong interactions with the supporting substrate. Recently, we demonstrated a persistent, all-optical gating effect in thin films of topological insulators, an effect which was based on the optical modulation of space-charge in an underlying $SrTiO_3$ substrate [1]. Here, we show that this optical gating effect can be utilized as a means of locally controlling the chemical potential in other ultra-thin electronic systems. We will present systematic optical and electrical transport measurements on monolayer graphene and the transition metal dichalcogenide $MoS_2$, showing a persistent, bidirectional optical effect on the carrier concentration of these materials when they are grown or placed on $SrTiO_3$. We will also discuss the outlook for potential extensions of this research, such as the creation of dynamically-configurable electronics that can be written, erased, and rewritten using light. 1] A. L. Yeats et al., Sci. Adv. 1, e1500640 (2015).

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