Abstract Submitted
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In Situ Thin Film Growth and Characterization of Topological Dirac Semimetal Na_3Bi[1] JACK HELLERSTEDT, MARK EDMONDS, CHANG LIU, Monash Centre for Atomically Thin Materials, NAVNEETH RAMAKRISHNAN, NUS Singapore, SHAFFIQUE ADAM, Yale-NUS College, MICHAEL FUHRER, Monash Centre for Atomically Thin Materials — The alkali pnictide Na_3Bi is a three-dimensional Dirac semimetal possessing Dirac-like dispersions in k_x, k_y and k_z, that has attracted recent interest as a condensed matter system for realizing the chiral anomaly [1]. The high reactivity of sodium makes conventional synthesis and characterization extremely difficult: we circumvent this issue by combining thin film growth with low temperature STM and magnetotransport in one comprehensive UHV system. We have successfully grown Na_3Bi on α-Al_2O_3 (0001) substrates, achieving low temperature mobilites in excess of 3,500 cm^2/Vs and carrier densities as low as 5×10^{12} cm^{-2}. Perpendicular magnetoresistance up to 1T shows quadratic behavior with weak anti-localization at low field. Quantitative analysis of this data suggests that our samples are in a charge inhomogeneous regime reminiscent of charge puddling in graphene [2]. [1] Xiong et. al Science (2015) doi:10.1126/science.aac6089 [2] Ramakrishnan et. al arXiv:1501.03815 (2015)

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