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Large upper critical field in ion-gated MoS2 superconductivity
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— Molybdenum disulfide (MoS_2) is an archetypal two-dimensional (2D) materials beyond graphene, and are attracting significant attention due to its multiple functionalities, including field effect transistor, photoluminescence, and valleytronics. An additional function of MoS_2 is electric-field-induced superconductivity, realized by ionic gating. In this presentation, we report anisotropic superconducting upper critical fields H_{c2} in electric-field-induced superconductivity on MoS_2, measured under high magnetic fields up to 55 T. We found that the in-plane H_{c2} increased with squarer root near T_c, reflecting the purely two-dimensionality of electric-field-induced superconductivity, and possibly reached nearly 60 T at $T \to 0K$. This value is around 5 times larger than the normal Pauli limit simply expected from the T_c value. Such an enhancement is possibly caused by the strong out-of-plane Zeeman filed, which is the consequence of the inplane-broken inversion symmetry of MoS_2 monolayer coupled with the spin orbit interactions.

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