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**Nematic, Ferroelectric, Quantum Hall States in Odd-layer Transition Metal Dichalcogenides** PATRICK CHEUNG, FAN ZHANG, Department of Physics, The University of Texas at Dallas — Three-fold rotational symmetry in transition metal dichalcogenides (TMDCs) leads to three elliptical electron pockets, with each of them centered at  $Q$ , a region between  $\Gamma$  and  $K$  in the momentum space. When this odd-layer triple-valley system is subject to a perpendicular magnetic field, spontaneous rotational symmetry breaking occurs when the lowest Landau levels are  $1/3$  or  $2/3$  filled. The resulting nematic state and the lack of inversion center for each pocket lead to a spontaneous electric polarization. This ferroelectric characteristic makes manipulation of electrons into a preferred single valley-polarized state by an applied electric field possible.

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