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Possible Topological Superconducting Phases of Heavy Gated MoS_2 NOAH YUAN, Hong Kong University of Science and Technology, K.F. MAK, Columbia University, K.T. LAW, Hong Kong University of Science and Technology — Molybdenum disulfide (MoS2) has attracted a lot of attention recently because of its grapheme-like crystal structure and massive Dirac spectrum at low energy. Recently, it was found that thin films of MoS2 become superconducting when they are heavy gated with a critical temperature of about 10 K at optimal gating [1]. In this presentation, we discuss the possible pairing symmetries of MoS2 according to group-theoretical calculations. Depending on the sign and strength of the on-site and next nearest neighbor interaction, we found that MoS2 can support two topological phases. In the chiral d-wave phase, the system breaks time-reversal symmetry spontaneously and supports chiral Majorana edge states. In a spin singlet and triplet mixing phases, the system respects time-reversal symmetry and support helical Majorana edge states. Experimental signatures of the topological superconducting phases are discussed.

[1] J. T. Ye et al. Science 338, 1193 (2012).

Noah Yuan
Hong Kong University of Science and Technology

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