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Topological exciton condensation and superstructures in semimetallic monolayer transition metal dichalcogenides WENYU SHAN, DI XIAO, Department of Physics, Carnegie Mellon University — Two-dimensional materials, such as monolayer transition metal dichalcogenides, provide excellent platform to study the interplay of topology, spin-orbit coupling and interaction effect. Recently it is proposed that 1T' WTe₂ and MoTe₂ may be topological semimetals under a Peierls-like distortion. In this work, we study the semimetal-insulator transition in such type of materials driven by excitonic instability. We find a regime of topological exciton condensation in the presence of spin-orbit coupling and strong anisotropy. New superstructure is generated, which allows possible experimental detection. This work is supported by DOE Basic Energy Sciences Grant No. DE-SC0012509

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