PARADIM theorists have recognized that lightly hole-doped transition metal dichalcogenides (TMDs) are natural candidates for the long sought odd-parity topological superconductor vital for ground-state topological quantum computing. An interface materials strategy is considered that will cause a band of spin-polarized electrons to pair into an odd-parity superconductor.

The strategy exploits the unique valley band structure of TMDs where valleys occur at $K$ and $K'$ just like graphene, but unlike graphene, TMDs have a special type of large spin-orbit coupling. These topological valley qubits are theorized to form in a hole-doped single-monolayer-thick TMD thin film synthesized on a strong ferromagnetic substrate. From theory the intra-valley pairing should have Chern number $C=\pm 1$, whereas the inter-valley pairing should have $C=2$. The intra-valley pairing that can be promoted by a strong magnetic field coming from an underlying active substrate, will give rise to an odd-parity topological superconductor with protected Majorana zero modes.