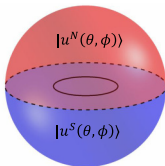


(a)



(b)

$$M_{ij}(\phi) = \langle u_i^N(\frac{\pi}{2}, \phi) | u_j^S(\frac{\pi}{2}, \phi) \rangle$$



gapped

(c)



(d)