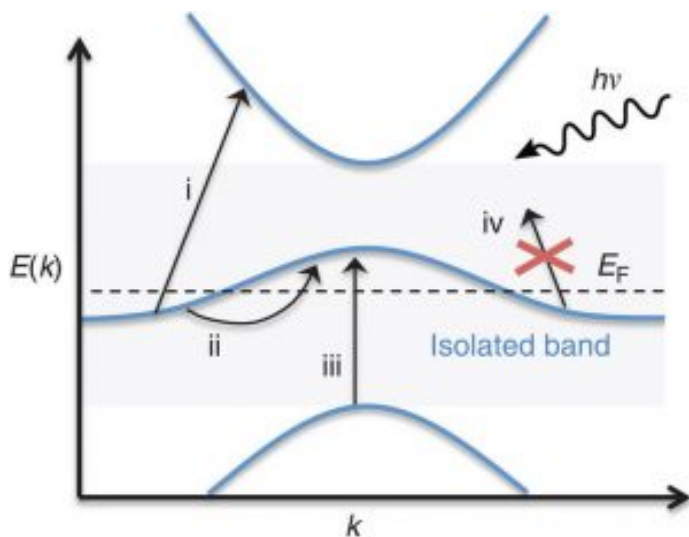


Band structure engineered layered metals for low-loss plasmonics



Plasmonics currently faces the problem of seemingly inevitable optical losses occurring in the metallic components that challenges the implementation of essentially any application. In this work, they show that Ohmic losses are reduced in certain layered metals, such as the transition metal dichalcogenide TaS₂, due to an extraordinarily small density of states for scattering in the near-IR originating from their special electronic band structure. On the basis of this observation, they propose a new class of band structure engineered van der Waals layered metals composed of hexagonal transition metal chalcogenide-halide layers with greatly suppressed intrinsic losses. Using first-principles calculations, they show that the suppression of optical losses lead to improved performance for thin-film waveguiding and transformation optics.

Sources: <https://www.nature.com/articles/ncomms15133>

Related paper: Morten N. Gjerding et al., Band structure

engineered layered metals for low-loss plasmonics, *Nature Communications* **8**, Article number: 15133 (2017).