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Andreev Reflection Spectra of d-wave Superconductors CHARLES SNIDER, JESSICA GIFFORD, JONATHAN MARTINEZ, TINGYONG CHEN, Arizona State University, CHEN TEAM — At a normal metal/superconductor interface Andreev reflection occurs, which can be utilized to measure spin polarization of the normal metal and also the superconducting gap of the superconductor. An s-wave superconductor has an isotropic gap and for an unpolarized current the Andreev reflection spectrum within the gap is twice that of outside the gap. A fully spin polarized current suppresses the Andreev reflection therefore causes zero conductance within the gap. The scenario is quite different in a d-wave superconductor because the order parameter has anisotropy and phase. In this work, we calculate Andreev Reelection spectra of an interface between a normal metal and a d-wave superconductor for a current with any polarization, based on the recent Chen-Tesanovic-Chien (CTC) model. It is shown that the point angle of the interface can drastically change the Andreev spectra and a zero bias anomaly (ZBA) is observed in the tunneling regime only if the point angle is large. The spin polarization can also drastically affect the spectra and can completely suppress the ZBA. Our calculation shows that one can use both the spin polarization and the point angle to verify the ZBA in unconventional superconductors.

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