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BCS-BEC Crossover Approach to the Optical Conductivity in high T_c Superconductors DAN WULIN, HAO GUO, James Franck Institute and Department of Physics, University of Chicago, CHIH-CHUN CHIEN, Los Alamos National Laboratory, KATHRYN LEVIN, James Franck Institute and Department of Physics, University of Chicago — We address the finite frequency ω conductivity in the cuprates. We presume that the pseudogap arises from stronger-than-BCS attraction, which leads to non-condensed pairs above and below T_c. Our theoretical formalism, which is consistent with gauge invariance and the transverse f-sum rule, yields a mid infrared peak associated with the energy needed to break pairs. It also leads to a situation in which very high ω spectral weight participates in the formation of the condensate. These observations, along with others reported here are consistent with experiment.

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