The evolution of microwave conductivity in YBa$_2$Cu$_3$O$_{6+x}$ across the superconducting dome JORDAN BAGLO, JAMES DAY, PINDER DOSANJH, RUIXING LIANG, WALTER HARDY, DOUG BONN, University of British Columbia — The rich phenomenology displayed in the phase diagram of the high-$T_c$ cuprates continues to be an active arena of investigation. Recent experimental and theoretical work appears to be converging on a picture of separate spin and charge order phase transitions – well-below and near optimal doping, respectively – along with associated Fermi surface reconstruction. As sensitive probes of the low-energy electrodynamics, microwave spectroscopy techniques are well-suited for characterizing the effects of such changes in electronic structure deep within the superconducting state. I will present the results of our survey of the complex microwave conductivity of YBa$_2$Cu$_3$O$_{6+x}$ over a wide range of oxygen contents, from 6.49 to 6.998, and discuss their implications for the evolution of electronic structure with doping. I will also discuss the surprising relationship we observed between quasiparticle scattering lifetimes and oxygen ordering, which carries important implications for quantum oscillation measurements.

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