Thermoelectric transport near the pair breaking quantum phase transition out of a $d$-wave superconductor DANIEL PODOLSKY, ASHVIN VISHWANATH, JOEL MOORE, University of California at Berkeley, SUBIR SACHDEV, Harvard University — We study electric, thermal, and thermoelectric conductivities in the vicinity of a $z = 2$ superconductor-diffusive metal transition in two dimensions, both in the high and low frequency limits. We find violation of the Wiedemann-Franz law, with a Lorentz ratio below the Sommerfeld value (more charge than heat transport). In addition, the dc thermoelectric conductivity $\alpha$ does not vanish at low temperatures, in contrast to Fermi liquids. We introduce a Langevin equation formalism to study critical dynamics over a broad region surrounding the quantum critical point.