Understanding the thermal conductivity of materials found in the cores of rocky planets can help us predict planetary evolution and understand the mechanisms necessary for the existence of organic life. However, significant variations in scientific modeling and a scarcity of experimental measurements limit our understanding of materials at the extremes of temperature and pressure. We propose to use our isochoric heating platform developed for the OMEGA 60 Laser System to recreate the conditions close to those found in the interiors of Earth-like planets. We will subject a 5 μm Fe/Ni (95/5 %wt) alloy wire (representing an iron planetary core) with a 10 μm borosilicate glass encasing (representing the silicate mantle) to planetary core conditions. After pressure equilibration, the shape of the density profile across the Fe95/Ni5-glass interface evolves primarily through thermal conductivity. This profile will be measured with a spatial resolution on the order of 1 μm, in line with previous work[1,2,3]. This will enable the accurate extraction of the conductivity scale length, which in turn will be used to validate competing theoretical models.