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Abstract for an Invited Paper
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Transport properties of the Earth's core

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I will report on the thermal and electrical conductivities of iron and two liquid silicon-oxygen-iron mixtures ($\text{Fe}_{0.82}\text{Si}_{0.10}\text{O}_{0.08}$ and $\text{Fe}_{0.79}\text{Si}_{0.08}\text{O}_{0.13}$), representative of the composition of the Earth's outer core at the relevant pressure-temperature conditions, obtained from density functional theory calculations with the Kubo-Greenwood formulation. We find thermal conductivities $k = 100$ (160) $\text{W m}^{-1} \text{K}^{-1}$, and electrical conductivities $\sigma = 1.1(1.3) \times 10^6 \Omega^{-1} \text{m}^{-1}$ at the top (bottom) of the outer core. These values are between 2 and 3 times higher than previous estimates, and have important implications for our understanding of the Earth's thermal history and the functioning of the Earth's magnetic field, including rapid cooling rate for the whole core or high level of radiogenic elements in the core.