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The Electrical Conductivity of Post-Perovskite in Earth's D" Layer

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Measurements of the electrical conductivity of $(Mg_{0.9}Fe_{0.1})SiO_3$ post-perovskite at high-pressure and -temperature show that the conductivity is higher than 10^2 siemens per meter with a minimal temperature dependence at the conditions of Earth's D" layer. The existence of a highly conductive post-perovskite layer above the core-mantle boundary enhances the exchange of angular momentum due to electromagnetic coupling between the fluid core and solid mantle, which can explain the observed changes in length of a day on decadal timescales. The heterogeneity in the lowermost mantle conductivity is likely to be a chemical origin rather than a thermal origin.