

Thermal conductivity of argon at high pressures and temperatures

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Diamond anvil cells (DACs) are used routinely in laboratories to apply extreme pressure to materials, recreating conditions that normally only occur deep in planetary interiors or during certain industrial manufacturing techniques. Under these conditions, however, it is difficult to measure how materials conduct heat.

To better understand [thermal conductivity](#), researchers from the United States and Sweden placed a thin film of iridium sandwiched between layers of argon in a DAC, subjected it to extreme pressure (50 gigapascals) and then used microsecond laser bursts to heat it to 2,500 degrees K. The researchers measured the temperature history of the iridium foil and used that data to calculate the thermal conductivity of the argon.

Their results confirmed that one model, kinetic theory, better matched observations than another model, Green-Kubo formalism. These results are important for ongoing studies of how minerals behave in the Earth's mantle and core.

More information: "Thermal conductivity of argon at high pressures and high temperatures" *Journal of Applied Physics*

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