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## Study shows how crystals become conductors

DAVIS, Calif., Feb. 6 (UPI) -- A U.S.-led study is being heralded as an advance in computer modeling for showing how manganese oxide crystals can become a conductive metal.

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Manganese oxide is magnetic, but does not conduct electricity under normal conditions because of strong interactions between the electrons surrounding atoms in the crystal, said University of California-Davis Professor Warren Pickett. But under pressures of about 1 million atmospheres (one megabar), manganese oxide transitions to a metallic state, he said.

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Using the model, the researchers found when atoms are forced together under high pressure, the magnetic properties of the manganese atoms become unstable and collapse, freeing the electrons to move through the crystal.

Manganese oxide has similar properties to iron oxide and silicon oxides that make up a major part of the Earth's crust and mantle. Understanding how the materials behave under enormous pressures deep underground could help geologists understand the Earth's interior, Pickett said.

The research that included scientists from the University of Augsburg, Germany, and the Ural State Technical University's Institute of Metal Physics in Yekaterinburg, Russia, appears in the online edition of the journal Nature Materials.

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## Breaking News

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- Michigan State Dubai campus under way
- Student charged in Memphis school shooting
- 'Real World' casts to reunite for show

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