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**Spin crossover systems in the deep mantle**

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In recent years there has been much interest on spin crossovers found experimentally in the most abundant minerals of Earth's lower mantle ((Mg,Fe)O and (Mg,Fe)(Si,Fe)O<sub>3</sub>-perovskite) under pressure. Spin crossovers are strongly dependent on thermodynamic conditions and a full understanding of this problem requires its investigation as function of pressure and temperature. There are several controversies, especially in the perovskite systems, and surprises are revealed by electronic structure calculations. The geophysical consequences of these crossovers are yet to be fully understood but could be fascinating. I will review progress we have made in understanding spin crossovers and give an overview of this phenomenon and its potential implications for the Earth.

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