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Metal-insulator and metal-metal behavior in filled-skutterudites LING YANG, SHAN-WEN TSAI, Department of Physics & Astronomy, UC Riverside — Filled-skutterudite compounds are of the form LT_4X_{12}, where L stands for Lanthanide, T stands for transition metal and X stands for Pnictogen. They show many unusual properties, and are also important due to their thermoelectric properties. Here we focus on the metal-insulator and metal-metal behavior observed in $PrRu_4P_{12}$ and $PrOs_4P_{12}$ compounds. We propose a simple model where motion of the L atom inside the atomic cage made by the other atoms plays a crucial role. In this model, the hopping amplitude of the charge carriers depends on the positions of the L atoms in different minima inside the cage, and a phase transition occurs when the temperature is lowered. The nature of the transition depends on the density of carriers.

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