

## Specific features of spin, charge, and orbital ordering in cobaltites

Ivanova N., Ovchinnikov S., Korshunov M., Eremin I., Kazak N.  
*Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia*

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### Abstract

Complex cobalt oxides known as cobaltites are reviewed, including LnCoO<sub>3</sub>-based perovskite-structured rare-earth cobaltites (where Ln is lanthanum or a lanthanide), quasi-two-dimensional and quasi-one-dimensional cobaltites of the types LnCo<sub>2</sub>O<sub>5+δ</sub>, La<sub>2</sub>CoO<sub>4</sub>, and Ca<sub>3</sub>Co<sub>2</sub>O<sub>8</sub>, and Na<sub>x</sub>CoO<sub>2</sub>·yH<sub>2</sub>O superconducting compounds. Key experimental and theoretical results are presented, with emphasis on the interplay between charge, spin, and orbital degrees of freedom. Two problems of specific relevance to cobaltites - the spin state instability of Co<sup>3+</sup> ions in LnCoO<sub>3</sub>, and the nature of superconductivity in Na<sub>x</sub>CoO<sub>2</sub>·yH<sub>2</sub>O - are also given significant attention. © 2009 Uspekhi Fizicheskikh Russian Academy of Sciences.

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