

Magnetic catalysis in QCD in a superstrong magnetic field

The study of quantum chromodynamics (QCD) in strong magnetic fields is a very popular direction of research. The interest to this topic is driven by the beauty of the underlying physics itself, as well as the promise of potential applications in studies of neutron stars, heavy-ion collisions, and the Early Universe. In particular, the magnetic catalysis and the inverse catalysis are the signature phenomena of QCD in superstrong magnetic fields. In this series of lectures, I will review the phenomenon of magnetic catalysis in a systematic way by starting from the basic underlying physics and an overview of the key quantum-field theoretical techniques. Then, I will demonstrate how the general ideas apply to realistic gauge theories, such as QED and QCD. Finally, I will discuss the current state in the field and present an outlook for future studies.

Summary

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