

Baryons and Interactions in Magnetic Fields

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Motivated by lattice QCD calculations in external fields, we study the behavior of single- and few-baryon systems in large magnetic fields. The dependence of single-baryon energies on magnetic fields is explored using chiral dynamics. Lattice calculations are argued to provide a valuable diagnostic on the chiral expansion for baryons. In particular, we show the unsatisfactory state of predictions for hyperon magnetic polarizabilities. For two-body systems, lattice calculations by the NPLQCD collaboration suggest that unitary nucleon interactions may be attained by tuning the magnetic field. The possibility of such universality is investigated using effective field theory to address the modification of two-nucleon interactions in large magnetic fields.

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