

Phases of Strong Interactions: the lattice approach

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Quantum Chromodynamics has a rich phase structure which can be explored by formulating the theory in a discrete space-time – the lattice. We will give a general overview of the phase structure in the space spanned by the number of flavours, quark masses, temperature and chemical potentials of conserved charges. We will focus on the physical case: in particular we will discuss the region explored by ultra relativistic heavy ion; and the higher temperatures, up to the freeze-out of the hypothesised QCD axion. We will examine critically the limitations of the lattice approach, and discuss current strategies to overcome them. Finally, we will briefly elaborate on QCD-like theories as a possible paradigm for Beyond Standard Model physics.

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