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Charged ρ condensation in magnetic fields

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The charged vector ρ meson in the presence of external magnetic fields has been in- vestigated in the frame-work of the Nambu–Jona-Lasinio model. The self-energy of the ρ meson contains the quark-loop contribution, i.e. the leading order contribution in 1/Nc expansion. The charged ρ meson mass is investigated numerically as a function of the magnetic field at zero temperature. It is found that the charged ρ meson mass decreases as the magnetic field increases and drops to zero at a critical magnetic field, which is found to be much lower than the value predicted by a point-like vector meson. The charged vec- tor meson condensation, i.e. the electromagnetic superconductor is induced in the QCD vacuum above the critical magnetic field.

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