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Landscape of Yang Mills vacuum fields and condensation of magnetic fluxes in QCD

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Abstract. The moduli space of covariantly constant gauge fields is infinite-dimensional and describes non-perturbative solutions of the Yang-Mills equation of superposed chromomagnetic flux tubes (vortices) of opposite magnetic charges. These gauge field configurations are stretched along the potential valleys of a constant energy density and are separated by potential barriers between classically degenerate vacua that are forming a complicated potential landscape of the QCD vacuum. It is suggested that the solutions describe the condensate of dense chromomagnetic vortices representing a dual analog of the Cooper pairs condensate in a superconductor. The solutions represent exact non-perturbative solutions of the YM equation in the background chromomagnetic field.

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