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Infrared behaviour of propagators and running coupling in the conformal window of QCD

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Using the Dyson-Schwinger approach we investigate QCD with a relatively large number of quark flavors in the chiral limit.

A self-consistent treatment of the corresponding propagator equations enables us to study unquenching effects directly via the quark loop diagram in the gluon equation.

Above the critical number of fermion flavors the non-perturbative running coupling develops a plateau over a wide momentum range. Correspondingly, the propagators follow a power law behavior in this momentum range indicating conformal behavior.

Our value $N_f^{crit} = 4.5$ is strongly sensitive to the details of the quark-gluon vertex calling for more detailed investigations in future studies.

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