



ID de Contribution: 34

Type: Non spécifié

## On the Proof of Chiral Symmetry Breaking from Anomaly Matching in QCD-like Theories

*mardi 16 avril 2024 17:34 (13 minutes)*

Confining QCD-like sectors are often present in BSM phenomenology. We critically reconsider the argument based on 't Hooft anomaly matching that aims at proving chiral symmetry breaking in 4d confining QCD-like theories with  $N_c > 2$  colors and  $N_f$  flavors. We provide a detailed proof and clarify under which (dynamical) conditions the historical approach of  $N_f$ -independence holds, as a property of the solutions of the anomaly matching and persistent mass equations. The validity of  $N_f$ -independence was assumed in previous works based on qualitative arguments, but it was never proven rigorously. Then, we furnish a novel strategy, called 'downlifting', that allows to prove chiral symmetry breaking for any  $N_f \geq p_{min}$ , where  $p_{min}$  is the smallest prime factor of  $N_c$ . Contrary to earlier attempts, our results do not rely on ad-hoc assumptions on the spectrum of massless bound states. The proof can be extended to  $N_f < p_{min}$  under the additional assumption on the absence of phase transitions when quark masses are sent to infinity.

**Auteurs principaux:** LUZIO, Andrea (Scuola Normale Superiore & INFN Pisa); XU, Ling-Xiao (Abdus Salam International Centre for Theoretical Physics); CIAMBRIELLO, Luca (Interdisciplinary Laboratories for Advanced Materials Physics (i-LAMP) & Università Cattolica del Sacro Cuor); ROMANO, Marcello (IPhT, CEA, CNRS, Université Paris-Saclay); CONTINO, Roberto (Sapienza Università di Roma & INFN Roma)

**Orateur:** ROMANO, Marcello (IPhT, CEA, CNRS, Université Paris-Saclay)

**Classification de Session:** Dark universe

**Classification de thématique:** Dark universe