Contribution ID: **152** Type: **not specified**

# Renormalization Group Equation and Dynamical Symmetry Breaking in a Supersymmetry Abelian Chern-Simons Model with Arbitrary Parameter of Gauge

*Thursday, 27 August 2015 16:50 (20 minutes)*

In this work, we investigate the consequences of the Renormalization Group Equation (RGE) in the determination of the effective superpotential in a supersymmetric model with an arbitrary parameter of gauge and, the impact of this improved calculation in the study of dynamical symmetry breaking. We consider an $\mathcal{N} = 1$ supersymmetric theory, including an Abelian Chern-Simons superfield coupled to N scalar superfields in (2+1) dimensional spacetime. The classical Lagrangian presents scale invariance, which is broken by radiative corrections to the effective superpotential. We calculate perturbative corrections, up to two-loops, to the divergent vertex functions of the model, using dimensional regularization and minimal subtraction scheme, in order to calculate the renormalization group functions $\beta$ and $\gamma$. Additionally, we compute the superpotential from the one point vertex function up to two-loops with an arbitrary parameter of gauge. In order to understand it, was necessary to use the identity of Nielsen for studying the behaviour of the superpotential minima. Using these
, together with the RGE, we are able to calculate an improved version of the effective superpotential, from which the dynamical symmetry breaking can be studied and, the results can also be

**Primary author:** Mr QUINTO, Andres (Universidade Federal do ABC)

**Co-author:** Dr FERRARI, Alysson (Universidade Federal do ABC)

**Presenter:** Mr QUINTO, Andres (Universidade Federal do ABC)

**Session Classification:** SUSY/String Models

**Track Classification:** SUSY/String Models