



INSTITUTO DE FÍSICA  
DE PARTÍCULAS Y DEL COSMOS

IPARCOS

Preprint Series in Particles and Cosmos Physics

n° IPARCOS-UCM-23-126

# The effect of Skyrme--Chern-Simon dynamics on gauged Skyrmions in $2+1$ dimensions

by F. Navarro-Lerida, E. Radu and, D. H. Tchrakian

**November 2023**

Plaza de las Ciencias, 1 28040 Madrid, Spain

[www.ucm.es/iparcos/](http://www.ucm.es/iparcos/)



UNIVERSIDAD  
**COMPLUTENSE**  
MADRID



## Abstract

We consider a generalization of the  $SO(2)$  gauged  $O(3)$  Skyrme model in  $2+1$  dimensions in the presence of a Skyrme--Chern-Simons (SCS) term, which is defined in terms of  $SO(2) \times SO(2)$  gauge fields together with an auxiliary  $O(5)$  Skyrme scalar. Several different truncations of the general model are considered, with the aim to reveal to what extent the properties found in models with a (usual) Chern-Simons (CS) term are present also for the case of a SCS term. The results in this work show that qualitatively a similar picture emerges, with e.g. the presence of negative slopes in the  $(E, Q)$  and  $(E, J)$ -curves. However, the deformation of the "baryon number" observed in the CS case (with a suitable potential function of the Skyrme scalar) is absent.

