UNIVERSITY OF MIAMI
COLLEGE of ARTS & SCIENCES

Miami Physics Conference 2023

Date: Dec 13-19, 2023

Location: LagoMar Resort

Affiliation: University of Florida

Konstantin Matchev

Identifying the Group-Theoretic Structure of Machine-Learned Symmetries

Abstract

Symmetries are the cornerstones of modern theoretical physics, as they imply fundamental conservation laws. In a series of papers, our group developed and tested a machine-learning algorithm for the discovery and identification of the continuous group of symmetries present in a labeled dataset. Our loss functions are designed to probe the subalgebra symmetry structure either during the initial stage of symmetry discovery or in a subsequent post-processing stage. The new methods are illustrated with examples from the U(n) Lie group family, as well as the exceptional groups G2, F4 and E6.