ICFO Colloquium Series: Radioactive Molecules are Dying to Reveal New Physics

RONALD FERNANDO GARCIA RUIZ

November 05, 2024
12:00 to 13:00
ICFO Auditorium

BIO:

Dr. Ronald Fernando Garcia Ruiz is an Assistant Professor at the Department of Physics at MIT. His research actives are focused on the development of laser spectroscopy techniques to investigate the properties of subatomic particles using atoms and molecules made up of short-lived radioactive nuclei. His experimental work provides unique information about the fundamental forces of nature, the properties of nuclear matter at the limits of existence, and the search for new physics beyond the Standard Model of particle physics.
Ronald grew up in a small town in the Colombian mountains. As a teenager he moved to Bogota, where he obtained a bachelor's degree in physics in 2009 at Universidad Nacional de Colombia. After earning a Master's degree in Physics in 2011 at Universidad Nacional

Autonoma de Mexico, he moved to Belgium to start his PhD degree at KU Leuven. Ronald was based at CERN during most of his PhD working on laser spectroscopy techniques for the study of short-lived atomic nuclei. After his PhD, he became a Research Associate at The University of Manchester (2016-2017). In 2018, he was awarded a CERN Research Fellowship to lead the local CRIS team. At CERN, he has led several experimental programmes motivated by modern developments in nuclear science, atomic physics and quantum chemistry.

ABSTRACT:
Recent advancements in the experimental manipulation and analysis of molecules are opening new avenues for exploring the fundamental laws of the universe. In particular, molecules that incorporate radioactive, heavy, octupole-deformed nuclei, such as radium, provide increased sensitivity for detecting yet-to-be-discovered parity and time-reversal violating nuclear properties [1,2]. The violation of these symmetries is a crucial condition for explaining the imbalance of matter and antimatter in the universe and can provide evidence for the existence of new fundamental particles. This colloquium will present recent highlights and perspectives from laser spectroscopy experiments on these species [1-4], as well as discuss the relevance of these experiments in addressing open problems in nuclear and particle physics.
Hosted by: ICREA Prof. Dr. Maciej Lewenstein