Contribution ID: **19** Type: **Talk**

Overview of physics results with coherent elastic neutrino-nucleus scattering data

Friday, 5 August 2022 14:35 (15 minutes)

The detection of **Coherent Elastic Neutrino-Nucleus Scattering (CEvNS)** performed in 2017 and 2021 with cesium iodide and in 2020 with liquid argon by the COHERENT collaboration has paved the way for precision phenomenological measurements of many diverse physical phenomena.
CEvNS is a neutral current process induced by the exchange of a Z boson that permits to put interesting constraints on **nuclear physics**, **neutrino electromagnetic properties** but it also represents a sensitive probe for **non-standard interactions (NSI)** that are not included in the SM, induced by yet to be discovered neutral vector and scalar bosons.
Recently, CEvNS has also been observed for the first time using antineutrinos from reactors at the Dresden-II site with a germanium detector called NCC-1701, allowing to obtain more stringent and complementary constraints.

In this talk, I will present an **overview of the physics reach of CEvNS**, presenting, in particular, the state of the art of the constraints on neutrino charge radii, milli-charges, and magnetic moments as well as new limits on NSI and different new physics models involving **light vector Z' mediators**. Complementarity of CEvNS constraints with nuclear physics with the recent PREX and CREX neutron-skin determinations will also be discussed, highlighting the interplay with the weak-mixing angle determination.
I will compare all the results obtained with the limits derived from other oscillation and scattering experiments and provide prospects for the future, given the large amount of CEvNS experiments that are currently being proposed or under construction.

Attendance type

In-person presentation

Primary author: CADEDDU, Matteo (INFN)

Presenter: CADEDDU, Matteo (INFN)

Session Classification: WG2: Neutrino Scattering Physics

Track Classification: WG2: Neutrino Scattering Physics