Contribution ID: **10** Type: **Invited**

Beta-decay studies to explore physics beyond the weak-interaction standard model

Wednesday 15 December 2021 09:00 (25 minutes)

The standard model (SM) of weak interaction describes all weak decays with an amazing precision. It contains two interaction types (or currents): vector currents and axial-vector currents. However, by requiring only Lorentz invariance, three more currents, scalar, tensor, and pseudo-scalar, are also allowed. For these "exotic" currents, only limits are defined today. Search for these currents and thus for physics beyond the standard model can be carried out in high-energy physics (e.g. at LHC) by searching for new particles as carriers of these new interactions. An alternative approach is possible via high-precision experiments with nuclear beta decay.

We will present the WISArD experiment at ISOLDE and new data acquired to search for deviations in the beta-neutrino angular correlation from SM predictions to constraint the strength of these exotic currents. In this experiment, the beta-delayed proton emission of 32Ar is used to deduce, from the shape of the energy distribution of proton peaks, the kinematical condition, under which the protons have been emitted and thus to gather information about the beta-neutrino angular distribution.

A different approach to search for beyond standard model interactions is to measure with high precision the properties of super-allowed 0+ -> 0+ beta decays. The corrected Ft value of these transitions enables one to determine limits of scalar currents via the Fierz interference term. In this context, an experiment recently carried out at ISOLDE with a 10C beam will be presented.

Author: BLANK, Bertram Andreas (Centre National de la Recherche Scientifique (FR))

Presenter: BLANK, Bertram Andreas (Centre National de la Recherche Scientifique (FR))

Session Classification: Beta-decay and fundamental interactions