

Probing the structure of weak interactions

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The Standard Model as a very successful theory of electroweak interactions postulates the basic assumption about the pure „V(ector)-A(xial vector)“ character of the interaction. Nevertheless, even after more than half a century of development of the model and experimental testing of its fundamental ingredients, experimental data still rule out the existence of other types of weak interactions (Scalar, Tensor) only at the few % level. Low-energy searches for these „forbidden components“ studying e.g. beta-neutrino angular correlations in beta-decay are complementary to high-energy experiments e.g. at the LHC.

A new project at ISOLDE/CERN to search for these forbidden components of weak interactions (or at least significantly improve their current experimental limits) WISArD (Weak-Interaction Studies with ^{32}Ar Decay) is being prepared. Experimental setup WISArD online on the beam of isotope separator ISOLDE plans to probe the existence of scalar currents in the weak interactions via the study of beta-delayed protons emitted in the decay of ^{32}Ar . High precision measurement of the kinematic energy shift of the protons emitted from the isobaric analogue state in moving recoil nuclei ^{32}Cl after the beta-decay of ^{32}Ar carries information about beta-neutrino angular correlations (different for a Scalar current compared to the dominant Vector current). Current status of the WISArD setup, first results of the commissioning proof-of-principle runs and perspectives of the present approach with its potential final precision will be presented.

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04

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