Contribution ID: **389** Type: **Parallel talk**

Light vector bosons and the weak mixing angle in the light of new reactor-based CEνNS experiments

Wednesday 30 August 2023 17:15 (15 minutes)

After the first observation of coherent elastic neutrino-nucleus scattering (CEνNS), the question arises how to further exploit this signal for a wide variety of future investigations. In this context, nuclear reactors with their intense emission of low-energy antineutrinos in combination with high-purity germanium detectors have already shown their potential for CEνNS studies and represent a scalable technology for future precision experiments. Measurements such as those performed by the CONUS collaboration are of interest since deviations from the Standard Model CEνNS prediction could indicate the existence of new neutrino interactions. In particular, a light vector boson may imply corrections to the Weinberg angle, so increasing the precision of this observable will help to probe additional U(1) extensions of the Standard Model. In this talk, we discuss the potential of future germanium-based reactor experiments for precision measurements. Using a data-based reactor antineutrino prediction, we present the experimental sensitivity to the weak mixing angle and the parameters of generic light vector models. In addition, the effects of characteristic experimental parameters such as detector mass and energy threshold are presented and it is shown where improvements in detector design could have the strongest impact on physics investigations. Finally, we flesh out our results by showing the potential of the recently announced follow-up experiment CONUS+.

Submitted on behalf of a Collaboration?

No

Primary authors: Prof. LINDNER, Manfred (Max-Planck-Institut fuer Kernphysik, Heidelberg, Germany); Dr SEN, Manibrata (Max-Planck-Institut für Kernphysik); RINK, Thomas (Max-Planck-Institut für Kernphysik, Heidelberg, Germany)

Presenter: RINK, Thomas (Max-Planck-Institut für Kernphysik, Heidelberg, Germany)

Session Classification: Neutrino physics and astrophysics

Track Classification: Neutrino physics and astrophysics