Contribution ID: 3

Type: Parallel

## New Evaluation of the $\gamma W$ -box Correction to $0^+ - 0^+$ Nuclear $\beta$ -Decay and $V_{ud}$ Extraction

Wednesday, 30 May 2018 18:10 (20 minutes)

Current most precise knowledge of the value of  $V_{ud}$  is obtained from the analysis of a number of superallowed nuclear  $\beta$ -decays. At present, the main limitation in precision of this determination is due to radiative corrections, more specifically the "inner"  $\gamma W$ -box correction that is independent of the electron spectrum but depends on hadronic structure. A novel dispersion formulation of the  $\gamma W$ -box is developed. It allows to test the validity and improve the previous evaluation of Marciano and Sirlin, which was based on several semi-empiric assumptions. Further effects, such as possible effects of the nuclear excitations both on inner and outer corrections are discussed.

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Session Classification: Tests of Symmetries and the Electroweak Interaction

Track Classification: TSEI