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Searching for Tensor Currents in the Weak Interaction in the β -decay of ${}^8\text{Li}$ and ${}^8\text{B}$

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The weak interaction of the Standard Model is well-described by a vector-axial vector, or 'V-A', structure, which reproduces both maximal parity violation and left-handed neutrinos in beta- decay. However, there is no first-principles reason that other the interactions, such as scalar (S) or tensor (T), may not be present. To search for possible tensor contributions to the weak interaction we measure the beta-neutrino correlation coefficient $a_{\beta\nu}$ in the Gamow-Teller beta-decays of ${}^8\text{Li}$ and ${}^8\text{B}$. The $A = 8$ decays are ideal to probe $a_{\beta\nu}$ due to the large Q-value and delayed alpha emission from the excited state ${}^8\text{Be}$. These measurements are completed with the Beta decay Paul Trap (BPT) at Argonne National Lab. The BPT is surrounded on 4 sides with double-sided silicon strip detectors backed by plastic scintillator detectors, which allow the kinematics of decay products from the trapped mass-8 ions to be over-constrained. We will present results from a high statistics measurement from the decay of ${}^8\text{Li}$, the first results from the decay of ${}^8\text{B}$, and the first R-Matrix fit of the ${}^8\text{B}$ β -decay final state distribution.

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