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A precise measurement of the $\frac{12}{12}^{+}$ to $\frac{12}{12}^{+}$ ft value in ^{19}Ne beta decay

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Abstract content
 (Max 300 words)
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The Standard Model (SM) of particle physics successfully describes the fundamental particles as well as their interactions. Despite this success, there is reason to believe that the SM is incomplete as many of the ingredients in the model are taken directly from the experimental evidence alone. For example, $\text{SU}(2)_L \times \text{U}(1)_Y$ standard electroweak theory allows only left-handed weak currents. However, several theoretical extensions to the model allows the change of massive exotic particles of both helicities, beyond the established V-A structure of weak interactions.

One way to look for physics beyond the SM is by low energy experiments that tests the symmetries in the model. The beta decay of ^{19}Ne is highly sensitive to right-handed (V+A) type of interactions. In this project we present data from a previous ^{19}Ne beta decay experiment to obtain its ft value with high accuracy and precision. The experiment was performed at TRIUMF (Canada's National Laboratory for Particle and Nuclear Physics), using an array of HPGe detectors and plastic scintillators called the 8π array and SCEPTAR respectively. Together with the beta asymmetry parameter for ^{19}Ne beta decay [1], the measured ft value can be used to place bounds on predicted right-handed weak interactions.

[1] F.P Calaprice et al., Phys. Rev. Lett, 38, 1566 (1975)

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Yes

Level for award (Hons, MSc, PhD, N/A)?

MSc

Main supervisor (name and email) and his / her institution

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