Measurement of the ^{8}B Neutrino Spectrum

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The neutrino spectrum from ^{8}B decay is a crucial ingredient in interpreting the data from solar neutrinos obtained in the SNO and Superkamiokande detector collaborations. The strength of the beta decay is influenced by the broad continuum of the alpha unstable ^{8}Be nucleus. A new technique has been used at the ATLAS accelerator at Argonne National Lab to measure this alpha spectrum. A beam of 28 MeV ^{8}B nuclei was produced by bombarding a ^{3}He gas cell with a ^{6}Li beam. ^{8}B nuclei with the proper energy were separated from the primary beam with a bending magnet and transported to the focal plane of the Enge split pole magnetic spectrograph where they were implanted into the center of a 91 μm thick Si detector. The advantage of this method, compared to earlier work [1,2], is that both alpha particles are detected in the same detector and systematic effects due to energy loss in catcher foils and detector dead layers are eliminated. The effect of the positron energy deposited in the Si detector was minimized by requiring a coincidence with a thin plastic scintillator. To calibrate the detector, ^{20}Na ions were produced and implanted with the same technique, and the resulting beta-delayed alpha lines were measured. This work was supported by DOE Contract no. W-31-109-ENG-38 and DE-AC03-76SF00098.

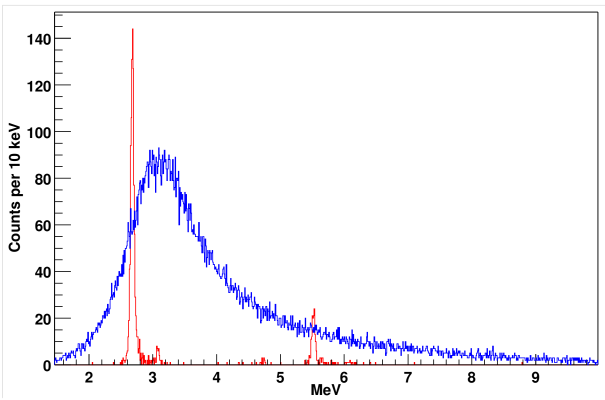

Figure 1: *Data from the latest run. The horizontal axis represents the energy of the alpha decay. The blue histogram is data from ^{8}B, the red histogram shows the calibration lines from ^{20}Na.*

References

[1] Bahcall, J.N. et al., Physical Review C **54** (1996) 411 and references therein.
[2] Ortiz, C.E. et al., Physical Review Letters **85** (2000) 2909.