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Determination of Energy Loss of 3-MeV alpha particles in Ni foil and ^{3}He Gas Using a Mg(α, γ) Resonance K.P. MICHNICKI, C. BORDEANU, J.D. LOWREY, K.A. SNOVER, D.W. STORM, University of Washington Department of Physics — The largest nuclear physics uncertainty in calculating the neutrino flux from the sun is presently in the value of ^{3}He +^{4}He S-factor. The cross section will be measured for alpha particles incident on a gas cell filled with ^{3}He. The cross-section for this reaction depends on the energy of the alpha particles. As the alpha particles pass through the ^{3}He gas cell, they lose energy, both in the foil window and in the gas. In order to minimize uncertainty in the measurement of $S_{34}(0)$, it is important to understand the energy distribution at different locations in the gas chamber. Excitation functions for the ^{24}Mg(α, γ) resonance at 3.1998MeV were obtained for various gas pressures and beam currents as well as without the gas and foil. By analyzing the excitation functions, we determine the separate energy losses in the foil and gas. We also measured the dependence of the energy loss on the beam current, thereby finding the effect of beam heating on the density. From the observed resonance width, we determined the total beam energy spread, due to straggling and foil nonuniformity.

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