

# Quasi-elastic Neutrino-Nucleus Cross Sections with Spectral Function

Hiroki Nakamura<sup>a</sup> and Ryoichi Seki<sup>b,c</sup>

<sup>a</sup> *Department of Physics, Waseda University, Tokyo 169-8555, Japan*

<sup>b</sup> *Department of Physics and Astronomy, California State University, Northridge, California 91330*

<sup>c</sup> *W.K. Kellogg Radiation Laboratory, 106-38, California Institute of Technology, Pasadena, California 91125*

The cross sections of inclusive quasi-elastic scattering,  $^{16}\text{O}(\nu, \mu^-)$  and  $^{16}\text{O}(\nu, p)$ , are examined in the plane-wave impulse approximation. We calculate the cross sections using the relativistic Fermi gas models and the realistic spectral function and compare them. The use of the spectral function that we believe to represent the realistic energy-momentum distribution of the ground-state  $^{16}\text{O}$  nucleus is found to *lower* the quasi-elastic contribution obtained by the use of the simple Fermi gas model. The spectral function includes effects of the short-range nuclear correlations as well as those of the long-range statistical correlations.

The  $\Delta$  formation contributions are also calculated and are shown to overlap with the quasi-elastic contributions for the neutrino energy above 1 GeV.

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