

SCALING DEVIATIONS FOR NEUTRINO REACTIONS
IN ASYMPTOTICALLY FREE FIELD THEORIES*

A. Zee,[†] F. Wilczek and S. B. Treiman

Joseph Henry Laboratories

Princeton University

Princeton, New Jersey 08540

MASTER

NOTICE

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Atomic Energy Commission, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.

ABSTRACT

Several aspects of deep inelastic neutrino scattering are discussed in the framework of asymptotically free field theories. We first consider the growth behavior of the total cross sections at large energies. Because of the deviations from strict scaling which are characteristic of such theories the growth need not be linear. However, upper and lower bounds are established which rather closely bracket a linear growth. We next consider in more detail the expected pattern of scaling deviation for the structure functions and, correspondingly, for the differential cross sections. The analysis here is based on certain speculative assumptions. The focus is on qualitative effects of scaling breakdown as they may show up in the x and y distributions. The last section of the paper deals with deviations from the Callan-Gross relation.

* Work supported by the National Science Foundation under grant GP-3078X; and by the U. S. Atomic Energy Commission under contract No. AT(11-1)-3072.

[†] Alfred P. Sloan Foundation Fellow

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

