

Electroweak Theory^{*)}

—Framework of On-Shell Renormalization
and Study of Higher-Order Effects—

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(Received August 9, 1982)

The electroweak theory (the Weinberg-Salam theory) is reviewed emphasizing its aspect of a renormalizable gauge field theory with spontaneous symmetry breaking. The on-shell renormalization procedure is developed where all the renormalization constants are fixed on the mass shell of gauge bosons, fermions and Higgs bosons. It is applied to the calculation of radiative corrections to leptonic processes $\nu_\mu e \rightarrow \nu_\mu e$, $\bar{\nu}_\mu e \rightarrow \bar{\nu}_\mu e$, $\nu_\mu e \rightarrow \mu \nu_e$ and $\mu \rightarrow e \bar{\nu}_e \nu_\mu$. The experimental significance of the radiative corrections and the effect of the corrections to the values of physical masses of W^\pm and Z are discussed. The relation among different renormalization procedures is clarified.

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^{*)} This work is supported in part by the Grant-in-Aid for scientific research from the Ministry of Education, Science and Culture.

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