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Hadronic Parity Violation with Cold Neutrons: New Experimental Results and their Implications.[1]

MICHAEL GERICKE, Univ of Manitoba

The hadronic weak interaction between nucleons remains one of the least well-understood aspects of electro-weak theory. The interaction is generally described in terms of 6 weak meson-nucleon coupling constants or the corresponding low energy constants in modern effective field theories. To make interpretable connections between the measured and calculated observables and constraint the coupling constants one needs a complete set of few-body experiments. To date, there is no complete set of experiments for any of the various theory models, which is mostly a result of the high degree of experimental difficulty. Nor have all of the measured or measurable observables been calculated in each model. The two most recent hadronic weak interaction measurement results from the NPDGamma and n3He parity-violating cold neutron capture experiments have achieved the smallest errors in this field yet and place significant new constraints on the theory. I will discuss the current experimental status and the implications with respect to theory, and briefly list some examples of upcoming and future experimental work.

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