Neutron β-decay and the Standard Model

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Abstract
The combination of neutron β-decay experiments at the Institut Laue-Langevin challenge the Standard Model of elementary particle physics: A measurement of the β-asymmetry A_0 and the world average of the neutron lifetime τ determine the first element $|V_{ud}|$ of the quark-mixing-CKM-matrix. With this value and the particle data group values for $|V_{ud}|$ and $|V_{ub}|$, the unitarity condition for the first row of the CKM-matrix deviate from unity by $\Delta = 0.0083(28)$, which is 3.0 times the stated error and conflicts the prediction of the Standard Model of particle physics. We compare our result with other sources of information for V_{ud}, like nuclear β-decay experiments or W physics at LEP.