CHPT in the EURIDICE Proposal

- To sharpen existing predictions of CHPT such that they can compete with high-precision data from new experiments
- To determine low-energy couplings from first principles
- To investigate order parameters of QCD (. . . , πK scattering, πK atoms)
- To investigate the evolution of chiral symmetry breaking with N_f and N_C
- Baryon CHPT and hypernuclei
- To improve the theoretical precision for the CKM matrix elements
- To improve the understanding of rare K decays
- Quark masses: . . . will provide a guide to lattice calculations for their extrapolations in the quark masses

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Measurement of the neutron lifetime using a gravitational trap and a low-temperature Fomblin coating

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Abstract

We present a new value for the neutron lifetime of $878.5 \pm 0.7_{\text{stat}} \pm 0.3_{\text{syst}}$. This result differs from the world average value (885.7 ± 0.8 s) by 6.5 standard deviations and by 5.6 standard deviations from the previous most precise result [Phys. Lett. B 483 (2000) 15]. However, this new value for the neutron lifetime together with a β-asymmetry in neutron decay, A_0, of $-0.1189(7)$ [Phys. Rev. Lett. 88 (2002) 211801] is in a good agreement with the Standard Model.

PACS: 13.30.-a

Keywords: Ultracold neutrons; Neutron lifetime

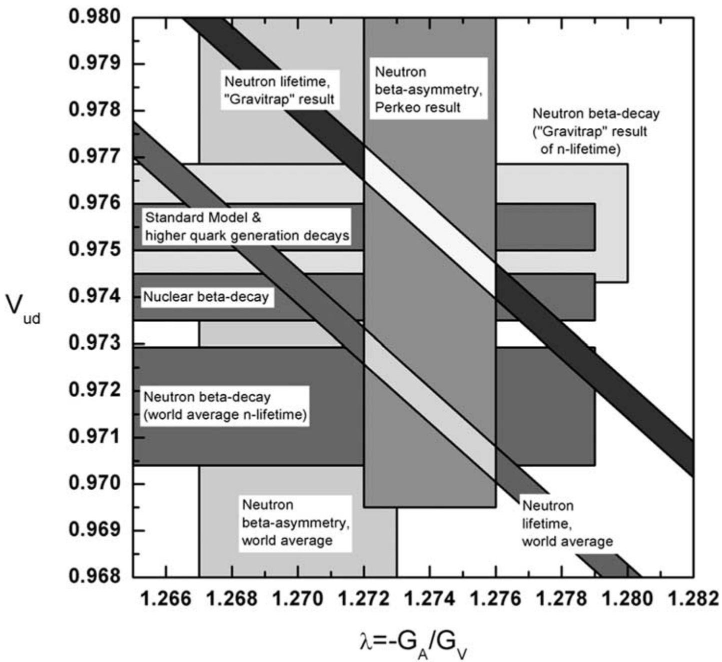

Fig. 4. $|V_{ud}|$ versus $-G_A/G_V$. $|V_{ud}|$ was derived from higher quark generation decays via $|V_{ud}| = \sqrt{1-|V_{us}|^2-|V_{ub}|^2}$ predicted from unitarity, from Ft values of nuclear-decays, and neutron β-decay.

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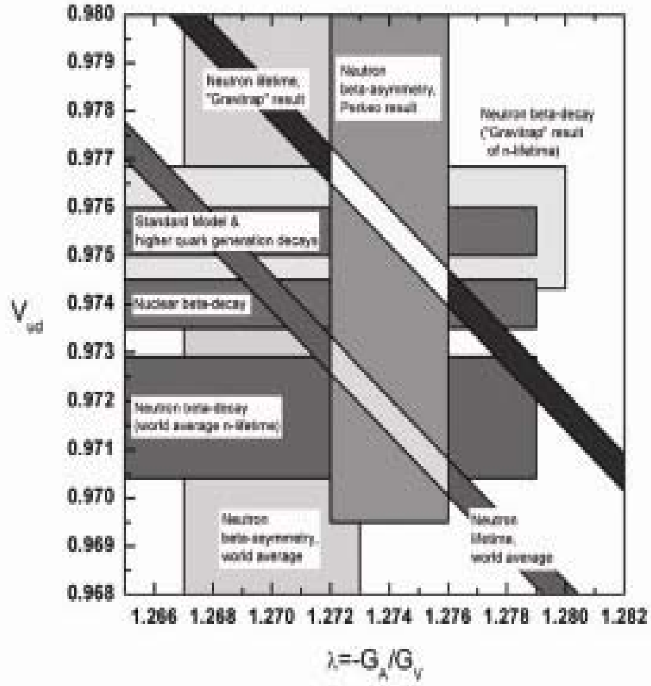

Fig. 4. $|V_{ud}|$ versus $-G_A/G_V$. $|V_{ud}|$ was derived from higher quark generation decays via $|V_{ud}| = \sqrt{1 - |V_{us}|^2 - |V_{ub}|^2}$ predicted from unitarity, from Ft values of nuclear-decays, and neutron β-decay.

with g_A (= λ) = 1.2739(19) → $|V_{ud}|$ = 0.9757(12)

unitarity → **$|V_{us}|$ = 0.2191(53)**

comparison with previous unitarity value from $|V_{ud}|$ = 0.9740(5) (SAFT):

$|V_{us}|$ = 0.2265(22)