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Charged kaon semileptonic decays and their ratio at the NA48/2 experiment; K0_{mu3} form factors at NA48 experiment

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Measured ratios of decay rates for $calR_{Ke3/K2\pi}$,
$calR_{K\mu3/K2\pi}$ and
$calR_{K\mu3/Ke3}$ are presented, based
on $K^{\pm}$ decays collected in a dedicated run in
2003 by the NA48/2 experiment at CERN. The results obtained are
$calR_{Ke3/K2\pi} = 0.2470 \pm 0.0009(stat) \pm 0.0004(syst)$ and
$calR_{K\mu3/K2\pi} = 0.1637 \pm 0.0006(stat) \pm 0.0003(syst)$.
Using the PDG average for
the $K^{\pm} \to \pi^{\pm}\pi^0$ normalisation mode, both
values are
found to be larger
than the current values given by the Particle Data Book and lead to a
larger magnitude of the $|V_{us}|$ CKM element than previously
accepted. When combined with the latest Particle Data Book value
of $|V_{ud}|$,
the result is in agreement with unitarity of the CKM matrix.
In addition,
a new measured value of $calR_{K\mu3/K2\pi} = 0.663 \pm 0.003(stat) \pm 0.001(syst)$
is compared to the semi-empirical predictions based on the
latest form factor
measurements.

The Kmu3 form factors have been measured from a sample of K_L
decays in a dedicated run in 1999 by the NA48
experiment at CERN. Studying the Dalitz plot density, using the
linear form factor
approximation, a measurement was made of
$\lambda_+ = 26.7 \pm 0.6_{stat} \pm 0.8_{sys} \times 10^-3$ and
$\lambda_0 = 11.7 \pm 0.7_{stat} \pm 1.0_{sys} \times 10^-3$.
Measurements were also made
using the quadratic parameterisation, the pole parameterisation
and the dispersive
parameterisation. The results of all parameterisations will be
presented.

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