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New precise measurements of radiative charged kaon and hyperon decays

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The NA48/2-Experiment at the CERN SPS has recorded more than 2 billion
charged kaon decays. From a sub-sample of this data set we have selected
about 2 x 10^5 practically background free events of the decay
K+- -> pi+- pi0
gamma, which is an order of magnitude more than from any previous
experiment. The decay K+- -> pi+- pi0 gamma is dominated by Inner
Bremsstrahlung (IB) of the K+- -> pi+- pi0 decay, but also exhibits a
contribution of Direct Emission (DE), which is of high theoretical interest, as well
as the interference between both amplitudes. We present a precise
measurement of both the DE amplitude and the interference between IB and
DE.
In addition, using the full data set, we have made the first observation of the
very rare decay K+- -> pi+- gamma e+ e-, which has large contributions from
higher order pion loops. We have measured the branching fraction and the
form factor of this decay.
Finally, from 2002 data set the weak radiative decay Xi0 -> Lambda e+ e-has
been detected for the first time. From 412 candidates in the signal region, with
an estimated background of 15 events, the branching ratio is measured and is
consistent with an internal bremsstrahlung process. The decay asymmetry
parameter is also determined, consistent with that of
Xi0 −>Lambda gamma which has been measured as well.

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