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Nonleptonic decay of the \Lambda hyperon

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We systematically study two-body nonleptonic decays of light lambda hyperon
with account for both short and long distance effects. The short distance effects are induced by five topologies of external and internal weak W ± exchange, while long distance effects are saturated by an inclusion of the so-called pole diagrams with an intermediate 1/2+ and 1/2− baryon resonances.
The contributions from 1/2+ resonances are calculated straightforwardly by account for nucleon and Σ baryons whereas the contributions from 1/2+ resonances are calculated by using the well-known soft-pion theorem in the current-algebra approach. It allows to express the parity-violating S-wave amplitude in terms of parity-conserving matrix elements. From our previous analysis of heavy baryons we know that short distance effects induced by internal topologies are not suppressed in comparison with external W -exchange diagram and must be included for description of data. Here, in the case of Λ decays we found that the contribution of external and internal W -exchange diagrams is sizably suppressed, e.g., by one order of magnitude in comparison with data, which are known with quite good accuracy. The major role to get consistency with experiment play pole diagrams.

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