Spin alignment in heavy and light flavour systems in Z^0 decays

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Abstract

Spin alignment of inclusive vector mesons and longitudinal polarization of Λ hyperons have been measured in a sample of 4.3 million hadronic Z^0 decays from the OPAL detector at LEP. Leading, light vector mesons have been found to populate preferentially the helicity-zero state, a result which has no firm theoretical explanation. The values of off-diagonal elements of the helicity density matrix are in agreement with a theory based on the standard model with coherent fragmentation. The longitudinal polarization of the Λ is well described by a model in which the constituent strange quark carries all of the hyperon spin.