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Measurement of Genuine Three-Particle Bose-Einstein Correlations in Hadronic Z decay

L3 Collaboration

Abstract

An analysis is performed of the three-particle Bose-Einstein (BE) correlation function in the process $e^+e^- \rightarrow Z \rightarrow hadrons$ with the L3 detector at LEP. The three-particle BE correlation function of like-charged pions and the contribution to this function due to two-particle BE correlations are measured. Genuine three-particle BE correlations are observed. In particular, using a non-Gaussian (Edgeworth) parametrization we find $\lambda = 0.75 \pm 0.10 \pm 0.03$, measuring the strength of the correlations, and $R = 0.72 \pm 0.08 \pm 0.03$ fm, measuring the effective source size in space-time. Combining this result with the measurement of two-particle BE correlations, we find that the data are consistent with a fully incoherent production mechanism of pions.

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