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Double Tag Events in Two Photon Collisions at LEP

L3 Collaboration

Abstract

Double-tag events in two-photon collisions are studied using the L3 detector at LEP centre-of-mass energies from $\sqrt{s}$ = 189 GeV to 209 GeV. The cross sections of the $e^+e^- \rightarrow e^+e^-$ *hadrons* and $\gamma^*\gamma^* \rightarrow$ *hadrons* processes are measured as a function of the photon virtualities, Q_1^2 and Q_2^2, of the two-photon mass, $W_{\gamma\gamma}$, and of the variable $Y = \ln(W_{\gamma\gamma}^2/Q_1Q_2)$, for an average photon virtuality $\langle Q^2 \rangle = 16$ GeV^2. The results are in agreement with next-to-leading order calculations for the process $\gamma^*\gamma^* \rightarrow q\bar{q}$ in the interval $2 \leq Y \leq 5$. An excess is observed in the interval $5 < Y \leq 7$, corresponding to $W_{\gamma\gamma}$ greater than 40 GeV . This may be interpreted as a sign of resolved photon QCD processes or the onset of BFKL phenomena.

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