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Search for Neutral Higgs Bosons in the Minimal Supersymmetric Extension of the Standard Model

The OPAL Collaboration

Abstract

A search for the neutral Higgs bosons h^0 and A^0, predicted by the Minimal Supersymmetric Extension of the Standard Model (MSSM), has been performed by the OPAL Collaboration at LEP. The analysis was based on approximately 75 pb^{-1} of data taken at centre-of-mass energies in the vicinity of the Z^0 resonance. No Higgs boson signals have been detected. Using, in addition, an upper limit on the contribution of non-Standard Model processes to the Z^0 boson width, almost the entire MSSM parameter space that can be reached at present LEP energies has been excluded. In particular, at the 95% confidence level, our results imply that $m_{h^0} > 44.5$ GeV/c^2 and $m_{A^0} > 24.3$ GeV/c^2, for $\tan\beta \geq 1$. The sensitivity to this assumption is discussed and the search results are also interpreted in the context of general two-doublet models.

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