

LEPP JOURNAL CLUB

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On the Spin and Parity of the New Boson at the LHC

The experimental determination of the properties of the newly discovered boson at the LHC is currently the most crucial task in the field of particle physics. Information about the spin, parity, and, more generally, the tensor structure of the boson couplings can be obtained by studying angular and mass distributions of events in which the resonance decays to pairs of gauge bosons, ZZ, WW, and 2γ . We show a complete Monte Carlo simulation and full analytic calculation of the process $pp \rightarrow X \rightarrow VV \rightarrow 4f$ accounting for all spin correlations and general couplings of a new boson with any spin. We show the first application of such techniques to the data from LHC in the approach of the matrix element likelihood (MELA). We present the prospects to separate extreme hypotheses of the spin and parity of the new boson with a confidence level of 99% or better for a wide range of models by the end of the current LHC run.

Friday
October 5, 12:00 pm
301 Physical Sciences Building
(Refreshments, 11:45am)

