Broader Use of Simplified Limits on Resonances at the LHC

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When an excess appears in LHC data, we should compare the results with broad classes of models, to get an immediate sense of which kinds of BSM theories could conceivably be relevant. Often, the new physics is likely to be an s-channel resonance. In this case, a simplified model of the resonance can translate an estimated signal cross section into bounds on the product of the dominant production and decay branching ratios. This quickly reveals whether a given class of models could possibly produce a signal of the required size at the LHC. This talk will outline a general framework and show how it operates for resonances of varying widths and with different numbers of production and decay modes. It will also discuss applications to cases of experimental interest, including resonances decaying to di-bosons, di-leptons, or di-jets. If the LHC experiments start reporting searches for BSM resonances in terms of the simplified limits variable ζ defined here, the community will home in more quickly on the models most likely to explain any observed excess.

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