

Searches for physics beyond the standard model in final states with long lived particles.

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Using 5.4 fb⁻¹ of data from ppbar collisions at $\sqrt{s}=1.96$ TeV recorded with the D0 detector at the Fermilab Tevatron collider we investigate various models of new physics using final states with new long-lived particles. We investigate models in which charged massive long-lived particles are pair produced, as well as models in which a single heavy ionizing state is observed in the detector. Such state could arise as the bound state of pairs of new fermions bound by a new SU(N) “infracolor” gauge coupling (quirks). We also investigate models in which relatively light particles exist in a “potential valley” separated from the standard model by a high potential barrier. This barrier could be crossed leading to the production of hidden valley particles which could decay to standard model particles after moderately short lifetimes. Results from multiple searches for hidden valley particles will be presented.

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