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The Recursive Jigsaw Reconstruction Technique

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Signal events where multiple missing neutral particles are present in a final state represent challenging topologies to search for new physics at the LHC. The key to any search is the ability to separate background-like events from signal-like events. Identifying such signal-like events, and extracting their properties, is exacerbated by a lack of knowledge of the particle masses and some missing kinematic handles. The “Recursive Jigsaw” reconstruction technique introduces a new approach to extracting information in events with open final states resulting from pair-production of objects.

We demonstrate sensitive analysis strategies to search for beyond standard model signatures by de-composing the final state objects into hemispheres and further sub-dividing them where necessary, based on the topology of interest. Backgrounds are controlled without recourse to conventional approaches based on variables such as missing transverse momentum and effective mass to select regions of sensitivity. Applications of the technique will be shown.

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