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# Large Radius Tracking at the ATLAS Experiment

Many exotics and SUSY models include particles which are long lived resulting in decays which are highly displaced from the proton-proton interaction point (IP). The standard track reconstruction algorithm used by the ATLAS collaboration is optimized for tracks from "primary" particles, which originate close to the IP. To this end, tight restrictions on the transverse and longitudinal impact parameters, as well as on several other tracking variables, are applied to improve the track reconstruction performance and to reduce the fake rate. This track reconstruction is very efficient for primary particles, but not for the non-prompt particles mentioned above. In order to reconstruct tracks with large impact parameters due to displaced decays, a tracking algorithm has been optimized to re-run with loosened requirements over the hits left over after standard track reconstruction has finished. Enabling this "retracking" has significantly increased the efficiency of reconstructing tracks from displaced decays, which has benefited the search for Beyond the Standard Model particles. This poster shows the results of studies which have been done to improve the retracking, and the impact of the inclusion of these tracks in recent ATLAS searches.

## Experimental Collaboration

ATLAS

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