

# Measuring the Mass of Dark Matter at the LHC

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Many methods have been developed for measuring the mass of invisible particles at hadron colliders that only use kinematic information. However, the uncertainty associated with measuring the mass of an invisible particle could be so large that it is indistinguishable from an effectively massless state. Monte Carlo is used to estimate lower bounds on how heavy an invisible particle must be in order for it to be distinguishable from a massless one at 95% CL, which we estimate to be  $O(10 \text{ GeV})$ . This result, to a good approximation, is independent of the way the massive final-state particle is produced. If there is a light dark-matter particle with mass  $O(10 \text{ GeV})$ , as suggested by some direct detection experiments, its presence will be difficult to unambiguously identify at the LHC, using kinematic information alone.