

## Area Seminar

Title Identifying dark matter interactions in monojet searches at the LHC

Date and Time 01/01/2014 16:00:00

Speaker Dr. Vikram Rentala

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Area Theoretical Physics

Venue Room No. 469

Abstract We study the discrimination of quark-initiated jets from gluon-initiated jets in monojet searches for dark matter using the technique of averaged jet energy profiles. We demonstrate our results in the context of effective field theories of dark matter interactions with quarks and gluons, but our methods apply more generally to a wide class of models. Different effective theories of dark matter and the standard model backgrounds each have a characteristic quark/gluon fraction for the leading jet. When used in conjunction with the traditional cut-and-count monojet search, the jet energy profile can be used to set stronger bounds on contact interactions of dark matter. In the event of a discovery of a monojet excess at the 14 TeV LHC, contact interactions between dark matter with quarks or with gluons can be differentiated at the 95% confidence level. For a given rate at the LHC, signal predictions at direct detection experiments for different dark matter interactions can span five orders of magnitude. The ability to identify these interactions allows us to make a tighter connection between LHC searches and direct detection experiments.