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Hidden valley searches in ATLAS

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A number of extensions of the Standard Model result in neutral and weakly-coupled particles that decay to multi hadrons or multi leptons with macroscopic decay lengths. These particles with decay paths that can be comparable with ATLAS detector dimensions represent, from an experimental point of view, a challenge both for the trigger and for the reconstruction capabilities of the ATLAS detector. We will present a set of signature driven triggers for the ATLAS detector that target such displaced decays and evaluate their performances for some benchmark models. and describe analysis strategies and limits on the production of such long-lived particles that can be achieved with the first 100 pb⁻¹.

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