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Review of Benchmark Models Used for Z'+MET Searches [15+5]

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We present a review of the models used for the search for a new leptonically decaying neutral vector boson in association with missing transverse energy by ATLAS, which was published as a conference note (ATLAS-CONF-2023-045) in August 2023. Three signal regions were defined as bins in the E_T^{miss} significance, and the search was performed by scanning across the dilepton invariant mass spectrum in each of these regions. No significant excess above the expected Standard Model background was observed, and limits were set on two benchmark models referred to as light-vector and dark-Higgs. It has been established that the particular benchmarks used in this search do not reproduce the observed dark-matter relic density, and we investigate possibilities for adjusting the models to satisfy the relic-density constraints. We also consider the impact on these models from other search constraints, in particular the s-channel constraints from the dark-matter summary effort by ATLAS (ATL-PHYS-PUB-2023-018), which for example includes limits from the inclusive dilepton and dijet searches. Plans are also made to provide fiducial cross-section limits for the signal regions used in the search in order ease reinterpretations of the search, but it is at the moment unclear if these limits will be available in time for this presentation.

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