# Recent Dark Matter combination summary from ATLAS

Ref: https://arxiv.org/abs/2306.00641

Results from a wide range of searches targeting different experimental signatures with and without missing transverse momentum ($E_T^{miss}$) are used to constrain a Two-Higgs-Doublet Model (2HDM) with an additional pseudo-scalar mediating the interaction between ordinary and dark matter (2HDM+a). The analyses use up to 139 $fb^{-1}$ of proton-proton collision data at a centre-of-mass energy $\sqrt{s}$ = 13 TeV recorded with the ATLAS detector at the Large Hadron Collider between 2015-2018. The results from three of the most sensitive searches are combined statistically. These searches target signatures with large $E_T^{miss}$ and a leptonically decaying Z boson; large $E_T^{miss}$ and a Higgs boson decaying to bottom quarks; and production of charged Higgs bosons in final states with top and bottom quarks, respectively. Constraints are derived for several common as well as new benchmark scenarios within the 2HDM+a.

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