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Sensitivity of 2HDMa searches to Inert Doublet Model

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Recasting is an extremely powerful tool to derive limits on new physics models. With so many NP models at our disposal, recasting makes it easy to use the limits derived on certain models by experimental searches, to constrain any model of our choice. However, this method can fail, if the model of our interest not only differs from the one it is being recasted from, in terms of event rates, but also leads to significantly different final state kinematics. In such cases, the experimental search, optimized for a specific model may become completely insensitive to the new model under study. A dedicated search would then be necessary to probe interesting regions of the new model. We present such a case for DM models, namely Inert Doublet Model with di-lepton+MET final state and its recasting from 2HDMa, using ATLAS full run-2 data.

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