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Light dark matter around 100 GeV from the inert doublet model

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We made global fits of the inert Higgs doublet model (IDM) in the light of collider and dark matter search limits and the requirement for a strongly first-order electroweak phase transition (EWPT). These show that there are still IDM parameter spaces compatible with the observational constraints considered. In particular, the data and theoretical requirements imposed favour the hypothesis for the existence of a scalar dark matter candidate around 100 GeV. This is mostly due to the pull towards lower masses by the EWPT constraint. The impact of electroweak precision measurements, the dark matter direct detection limits, and the condition for obtaining a strongly enough first-order EWPT, all have strong dependence, sometimes in opposing directions, on the mass splittings between the IDM scalars.

Primary authors: Ms KALHOR, Leila (Shahid Beheshti University); Dr ABDUSSALAM, shehu (Shahid Beheshti University); Mr MOHAMMADIDOUST, Mohammad (Shahid Beheshti University)

Presenter: Ms KALHOR, Leila (Shahid Beheshti University)

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