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Searches of Higgs Boson decays into Dark Matter particles in the ATLAS and CMS experiments

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This report presents the latest results and analysis strategy for the search for Higgs boson decays into dark matter (DM) particles using data collected during Runs 1 and 2 of the Large Hadron Collider (LHC). The search is interpreted within Higgs-portal models, in which the Higgs boson provides a connection between the Standard Model and the dark sector. Upper limits on the Higgs boson branching fraction to invisible final states are derived at a 95% confidence level, assuming the Standard Model Higgs boson production cross section. The obtained limits represent the most stringent constraints from the ATLAS and CMS experiments at the LHC to date. These values from the ATLAS experiment are compared with the results of direct search experiments.

The prospects for extending the ATLAS search using data collected during the initial period of LHC Run 3 are also discussed, with particular emphasis on the expected sensitivity to invisible Higgs boson decays.

Primary author(s) : POKIDOVA, Marina (NRC Kurchatov Institute PNPI); NARYSHKIN, Yuri (NRC Kurchatov Institute PNPI)

Presenter(s) : POKIDOVA, Marina (NRC Kurchatov Institute PNPI)

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