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Di-photon excess illuminates Dark Matter

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We propose a simplified model of dark matter with a scalar mediator to accommodate the di-photon excess recently observed by the ATLAS and CMS collaborations. Decays of the resonance into dark matter can easily account for a relatively large width of the scalar resonance, while the magnitude of the total width combined with the constraint on dark matter relic density lead to sharp predictions on the parameters of the Dark Sector. Under the assumption of a rather large width, the model predicts a signal consistent with ~300 GeV dark matter particle in channels with large missing energy. This prediction is not yet severely bounded by LHC Run I searches and will be accessible at the LHC Run II in the jet plus missing energy channel with more luminosity. Our analysis also considers astrophysical constraints, pointing out that future direct detection experiments will be sensitive to this scenario.

Primary author(s) : MARIOTTI, Alberto (VUB)

Presenter(s) : MARIOTTI, Alberto (VUB)

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