s-channel simplified models for mono-jet

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DM Forum
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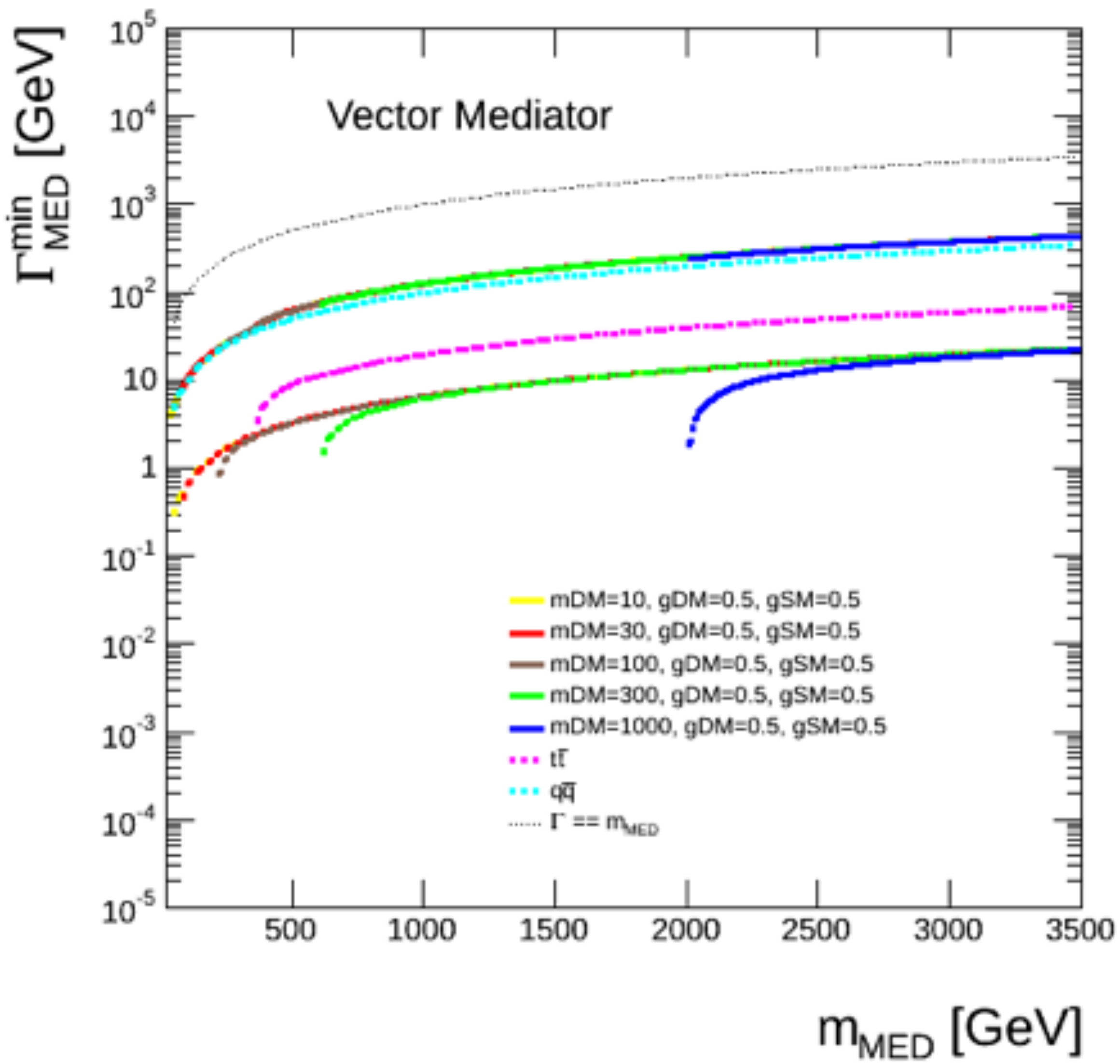
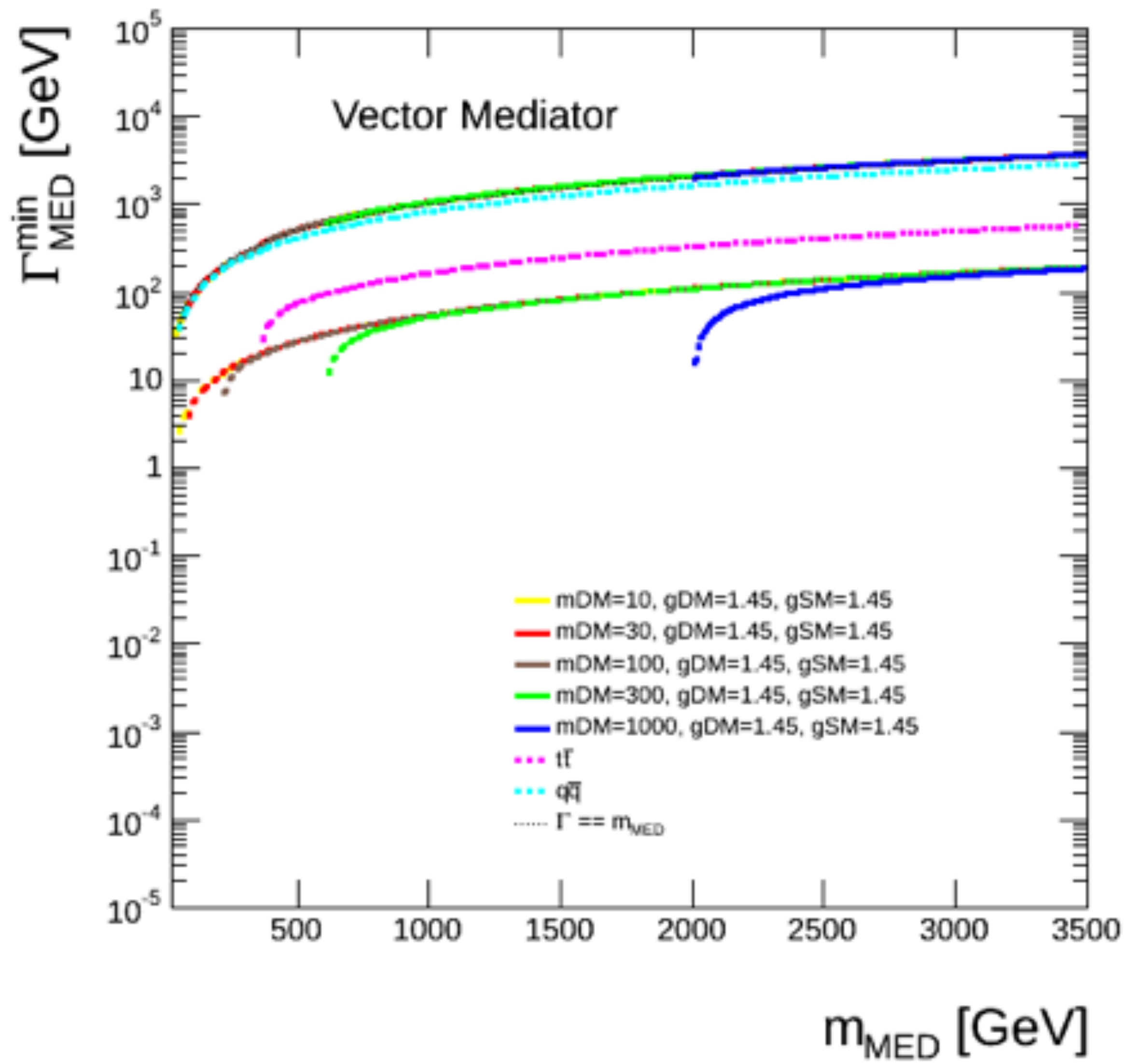
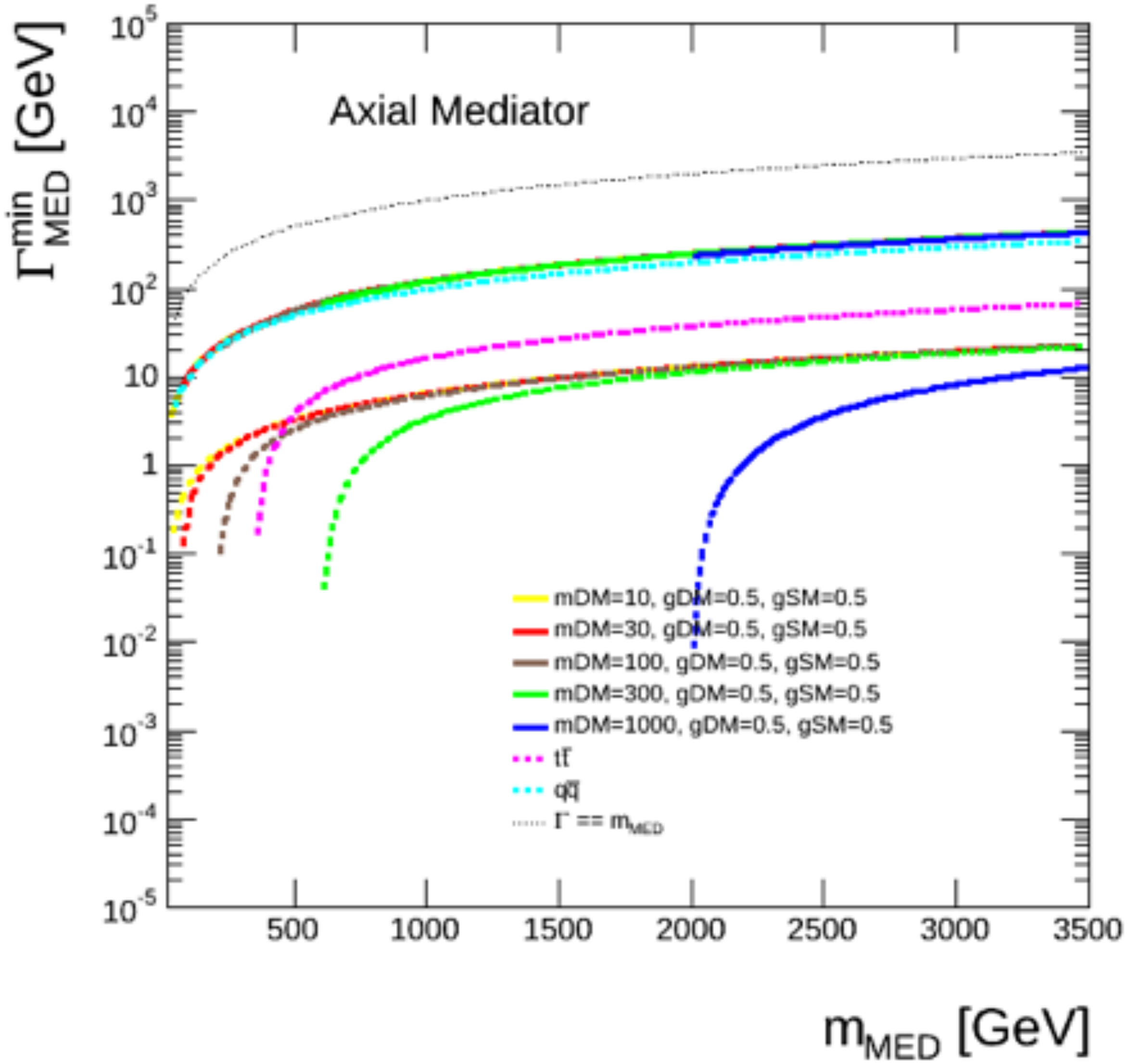
Mediator width (V)

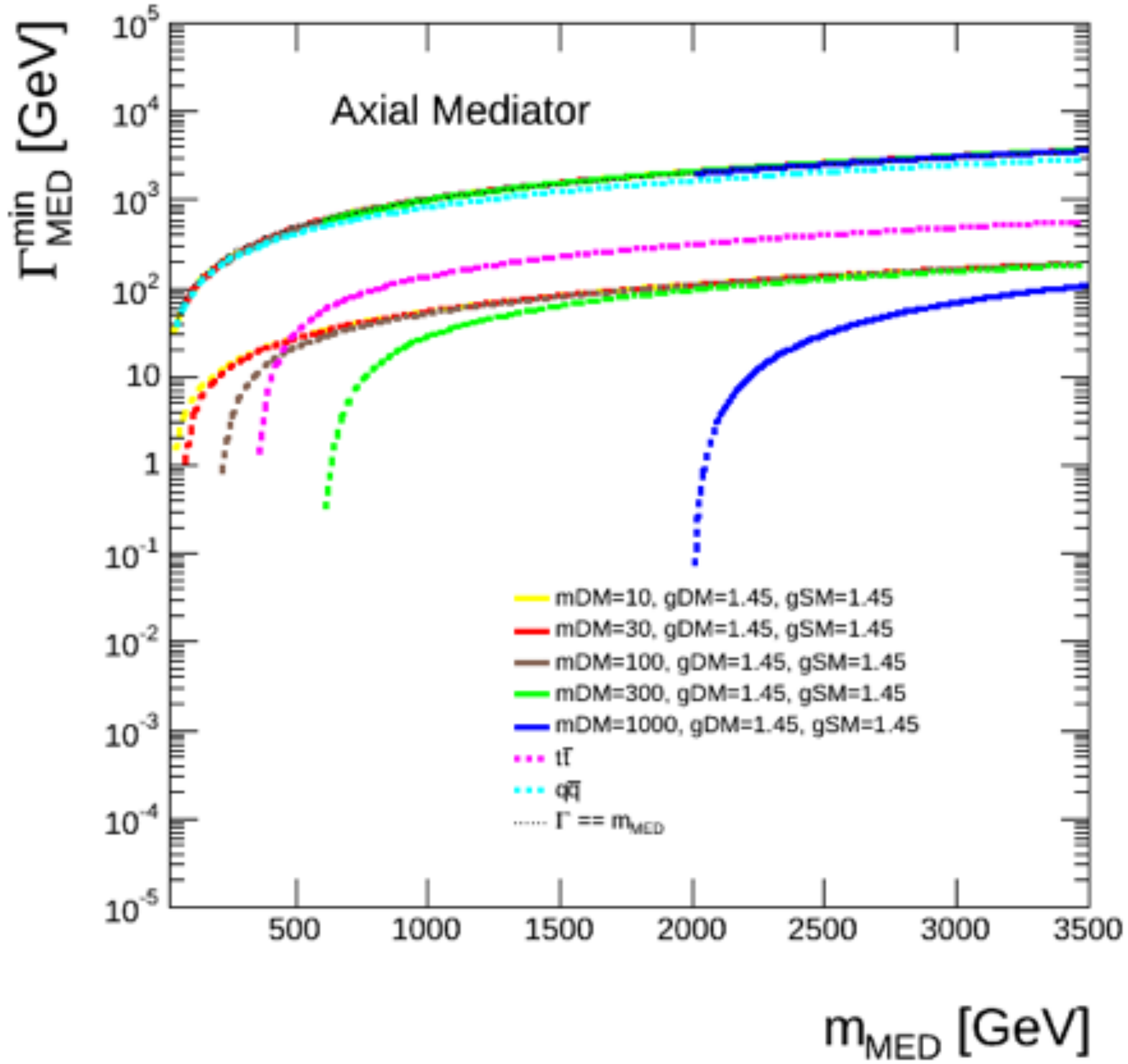
- Set of couplings used: (gSM, gDM) = (0.5, 0.5), (1, 1), (1.45, 1.45), (1, 0.25)
- For g = 1.45, we see the mediator widths approaches the mediator mass.





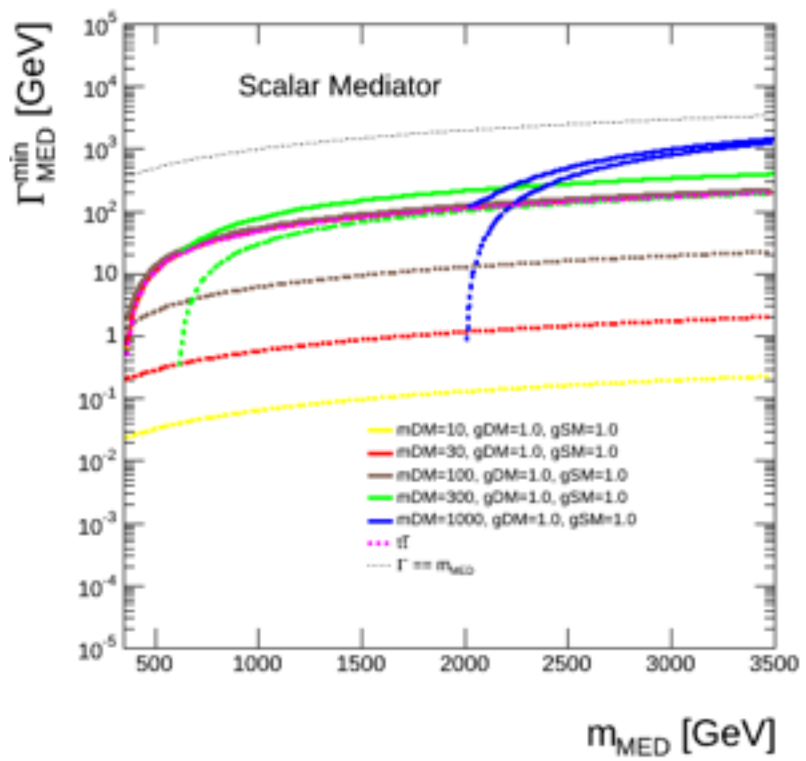
Mediator width (A)

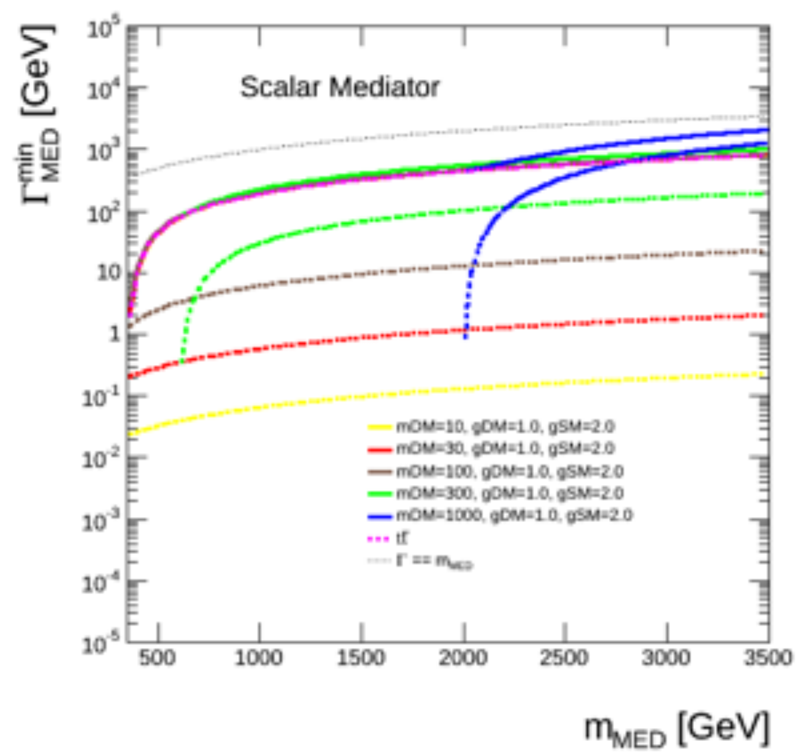


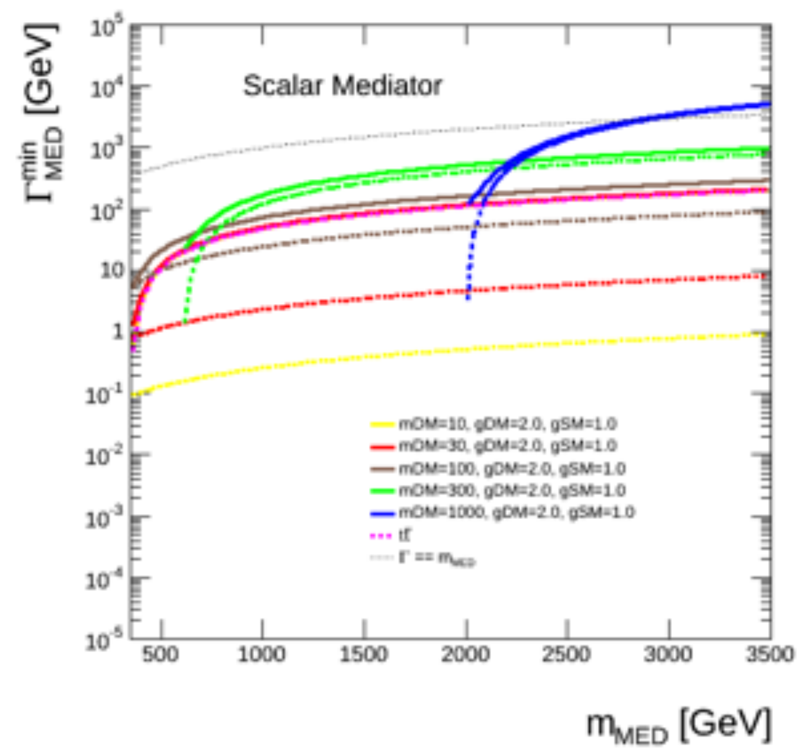


Mediator width (S)

- Set of couplings used (gSM, gDM) = (1, 1), (1, 2), (2, 1), (2, 2)
- We could probe even larger couplings (there is still room until Γ = mass)
- No need to consider Γmin and Γmin + Γtop → this can be achieved e.g. by comparing gSM = 1 and gSM = 2 (since the contribution from top anyway dominates as other quarks are Yukawa suppressed)

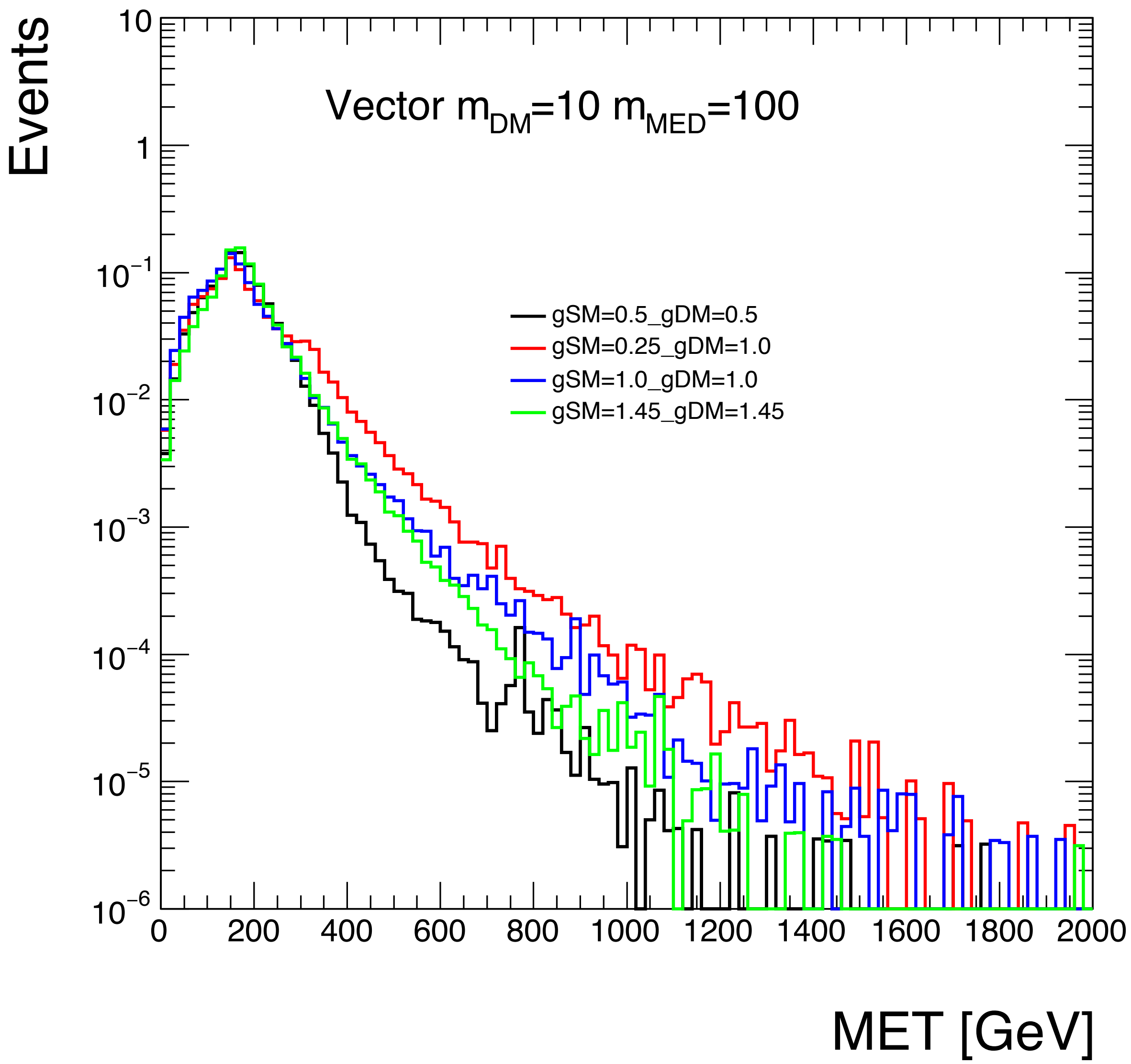


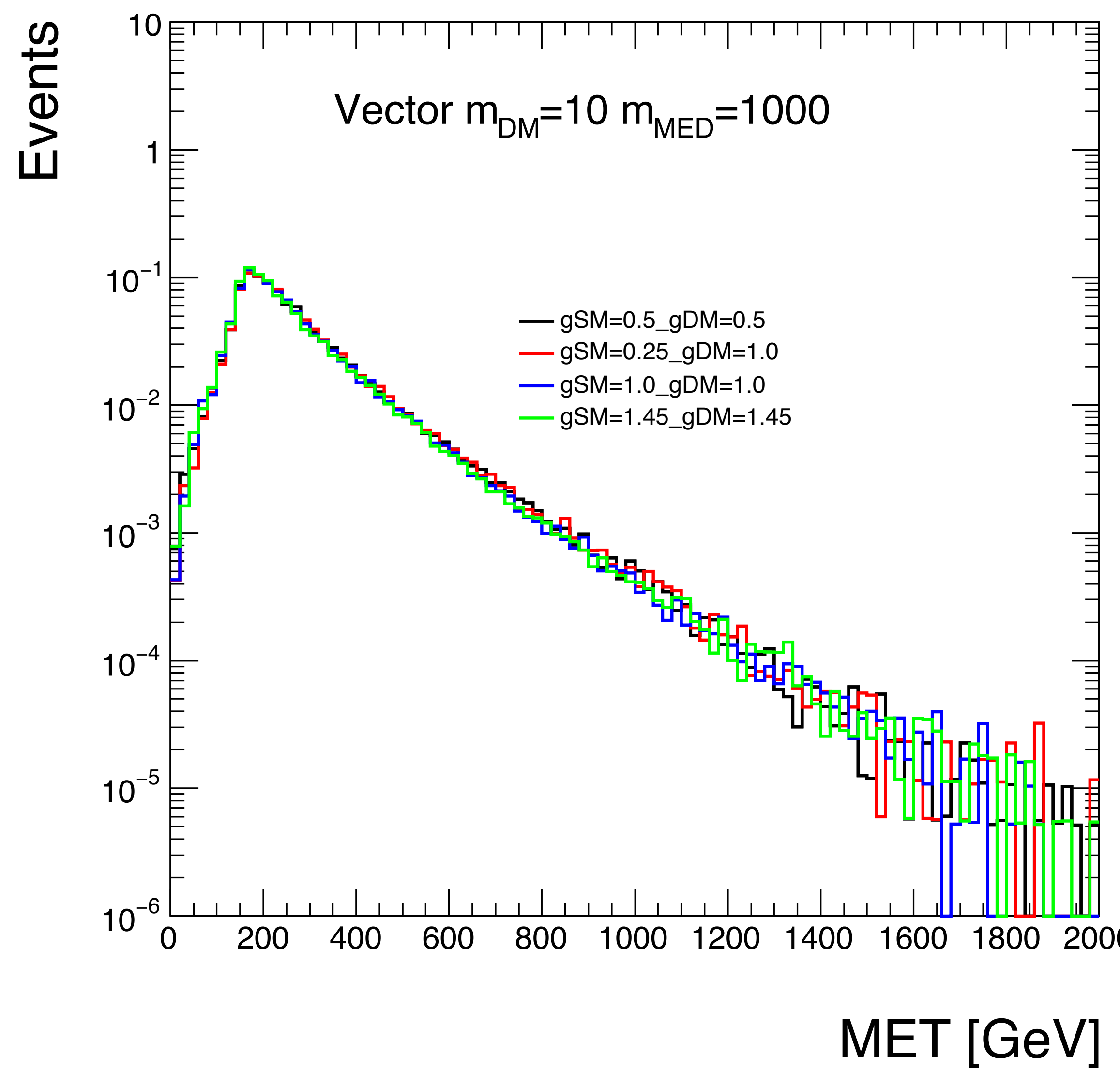




Different coupling strength

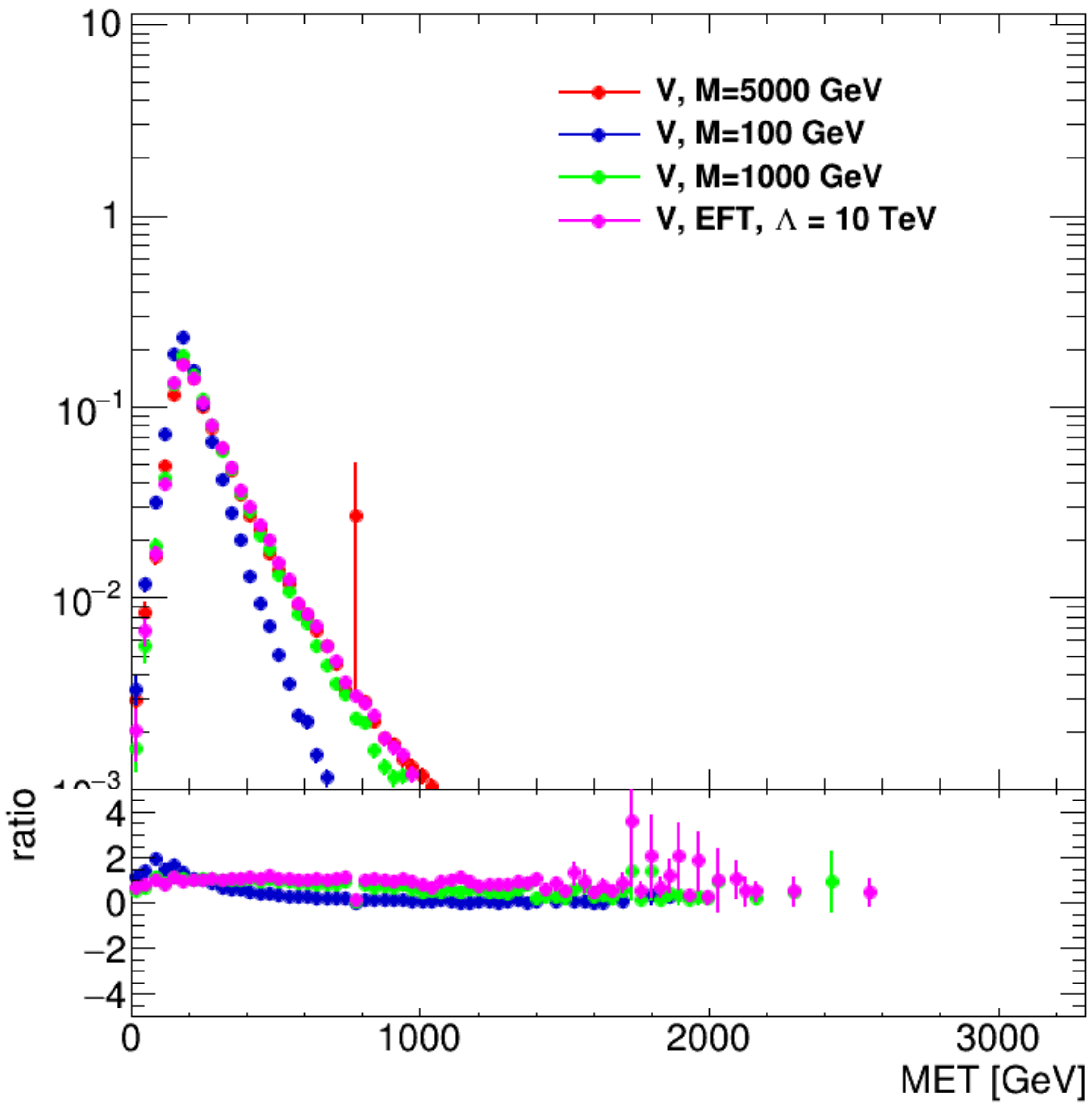
- Coupling strength not only influences the width (i.e. the cross section), it also has an effect on kinematic distributions.

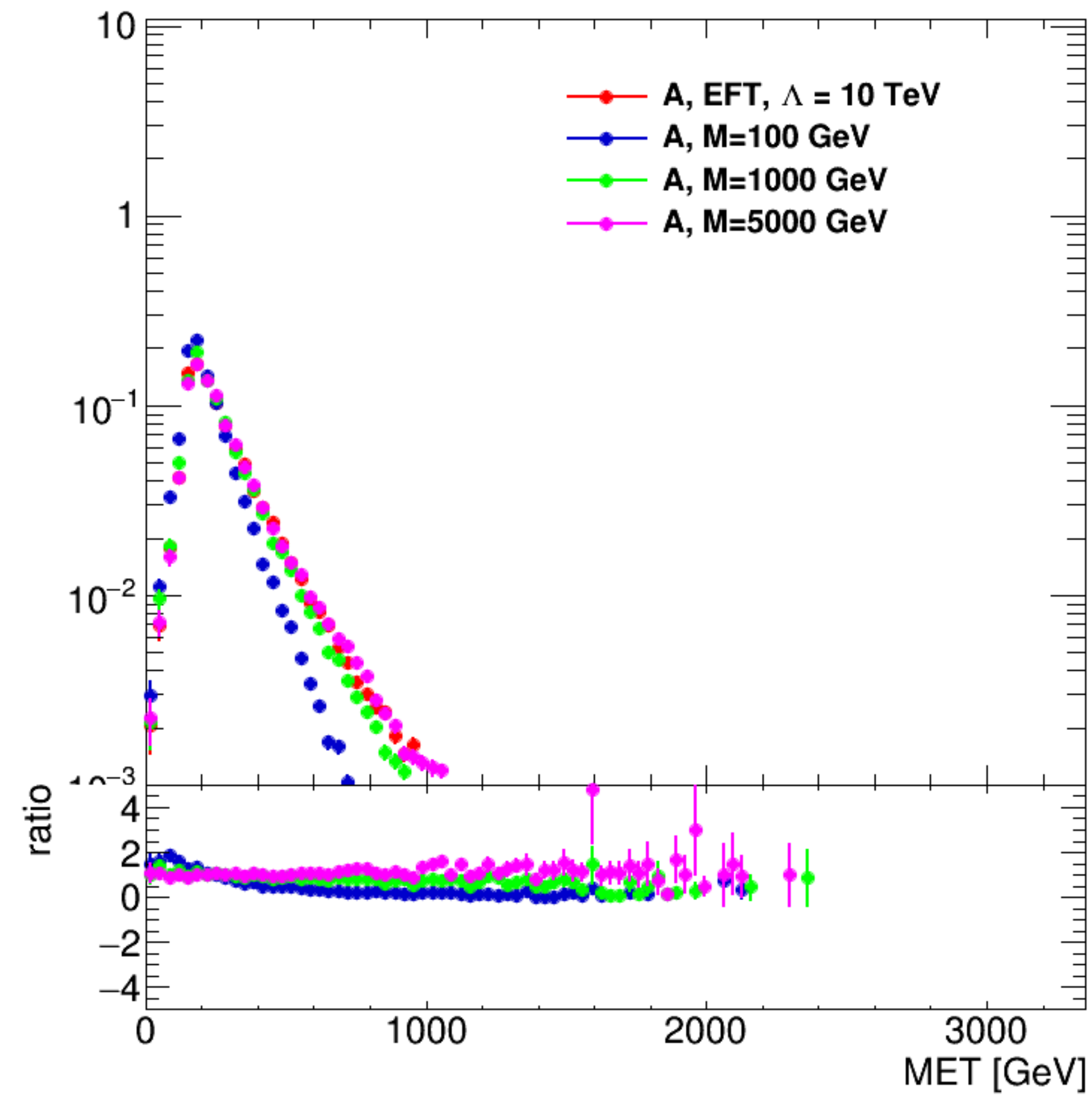




different mediator mass

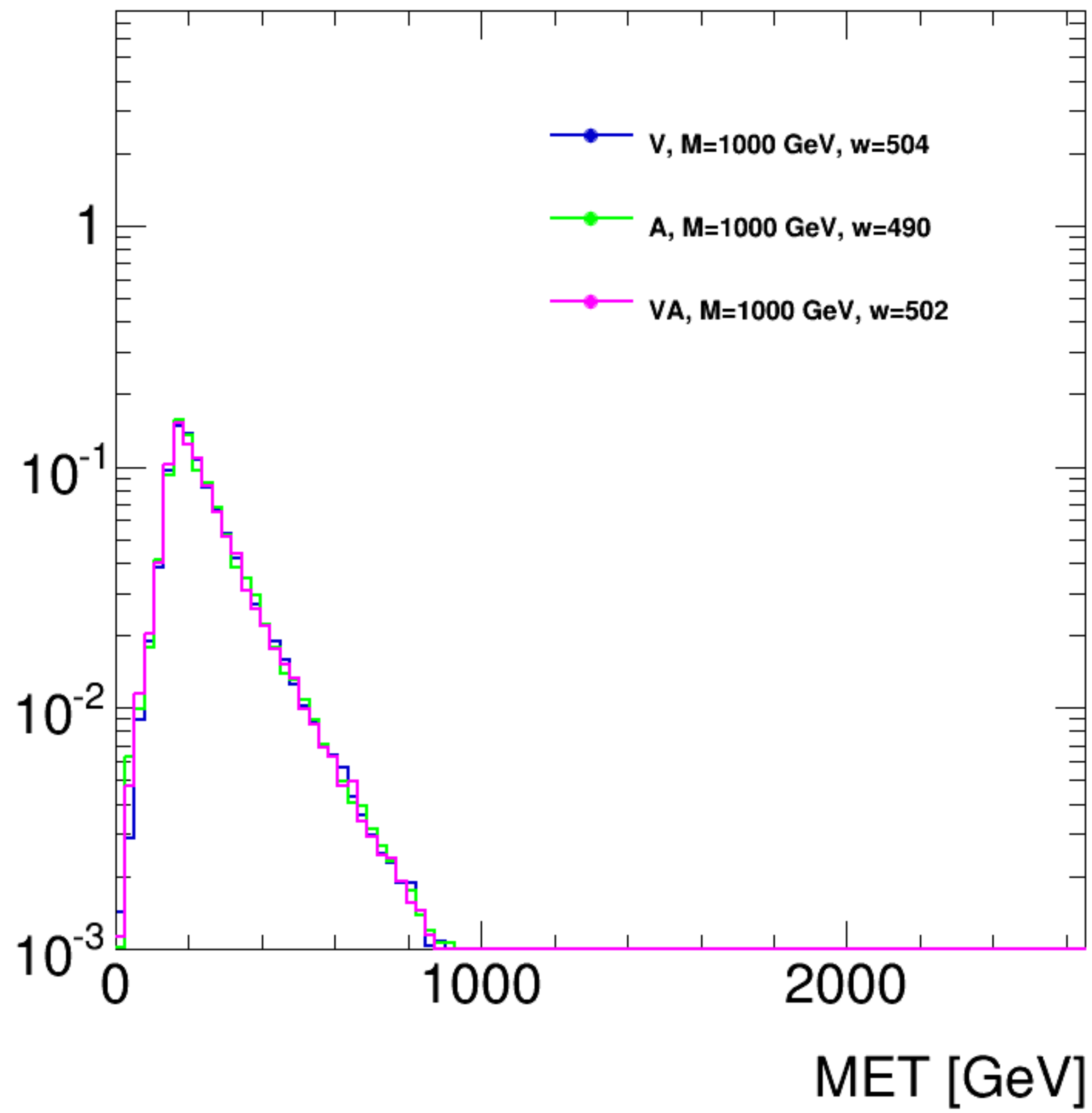
- mDM = 100 GeV, gDM = gSM = 1
- Comparison to the contact interaction is also shown.





VV, AA, VA, AV

- work in progress (samples are in production)
- The aim is to understand differences among the four operators in the cases where mMed < 2mDM, 2 TeV > mMed > 2mDM, mMed > 2 TeV



Plan

- Finalize the proposal of the coupling strength for V, A, S, P
- Provide extensive comparison of kinematic distributions for V, A, S, P (and compare to EFT)
- For the scalar operator, consider cases with the top loop calculation and also with the EFT vertex to account for heavy top partners.
- Compare VV, AA, VA, AV interactions.