Update on observable phase spaces

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Update on observable phase space plots

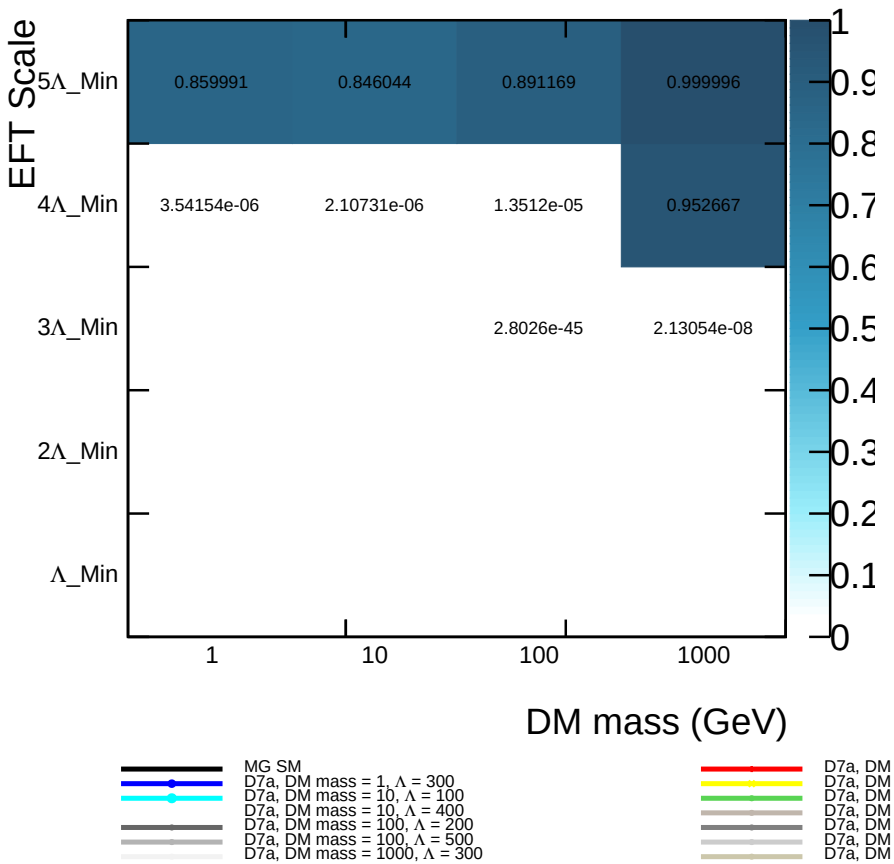
Done:

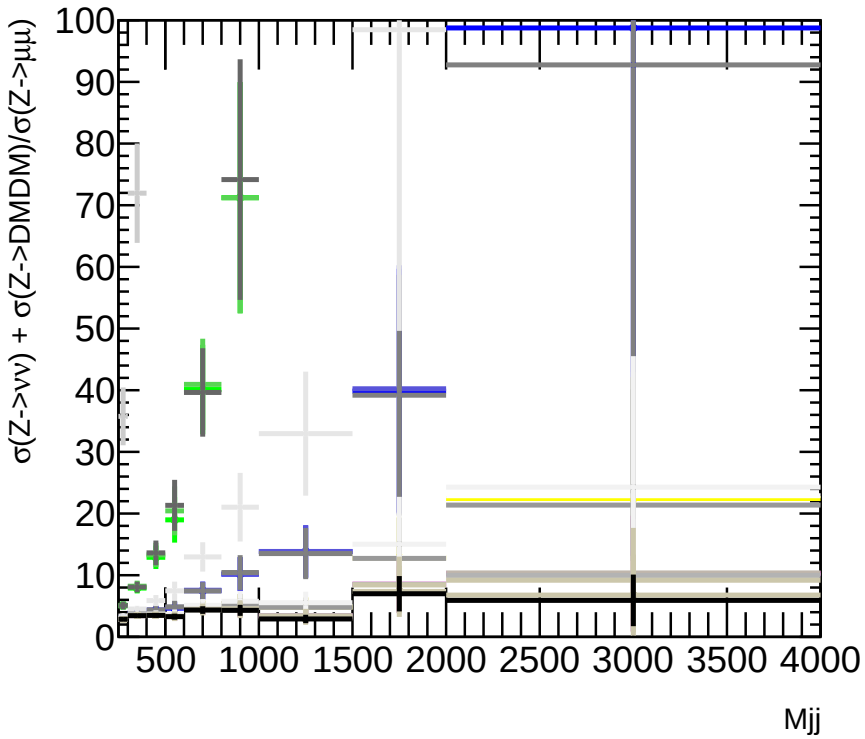
- Fixed bug causing EFT scale to not make a difference.
- Found issue with the SM being normalised to 1: Though still not as big as the corrected data from Emily. This could be due to not having the jet veto as only two jets are currently being produced.

To-do:

- Add more masses and scales (iterate though a large number of scales).
- Change calculation of ratio to prevent double counting of uncertainties.
- Make more presentable (Swap the colour scheme around, Change the range of the y axis on the ratio plots, Fix the y axis on the phase space plots, etc.).

Observable phase space plots : Mjj : D7a

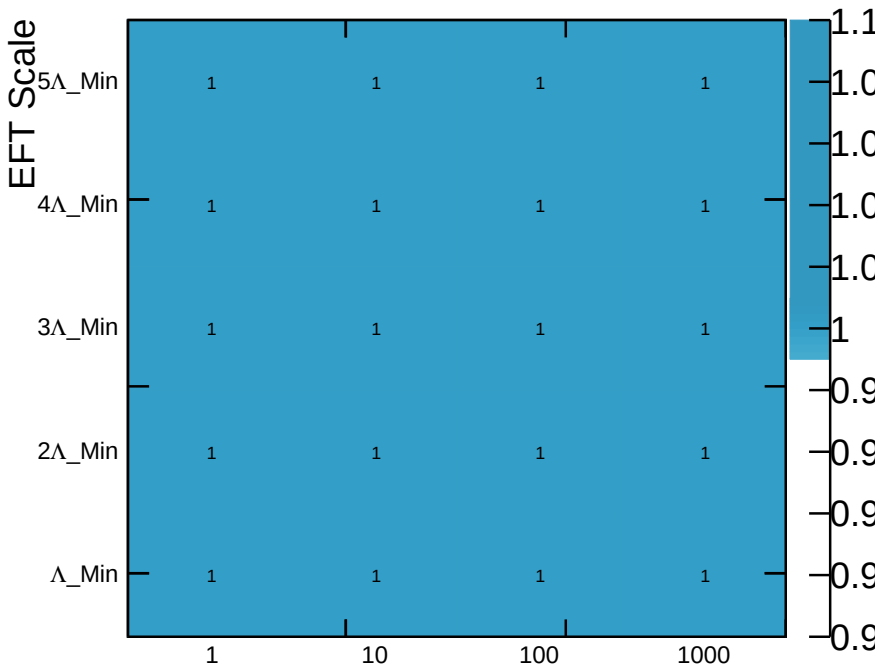


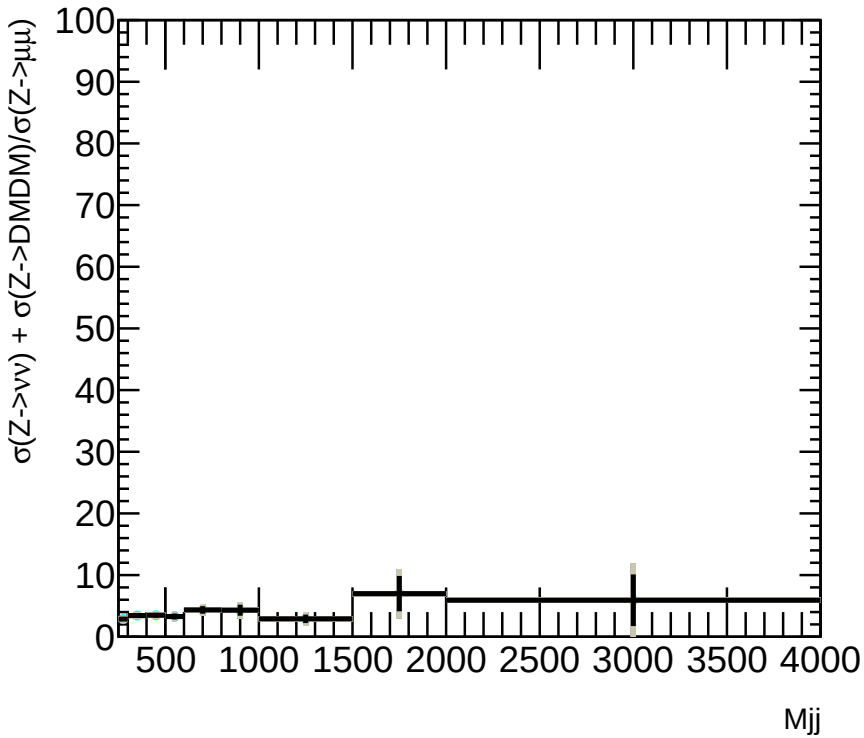


MG SM
D7a, DM mass = 1, Λ = 300
D7a, DM mass = 10, Λ = 100
D7a, DM mass = 10, Λ = 400
D7a, DM mass = 100, Λ = 200
D7a, DM mass = 100, Λ = 500
D7a, DM mass = 1000, Λ = 300
D7a, DM mass = 1, Λ = 100
D7a, DM mass = 1, Λ = 400
D7a, DM mass = 10, Λ = 200
D7a, DM mass = 10, Λ = 500
D7a, DM mass = 100, Λ = 300
D7a, DM mass = 1000, Λ = 100
D7a, DM mass = 1000, Λ = 400
D7a, DM mass = 1, Λ = 200
D7a, DM mass = 1, Λ = 500
D7a, DM mass = 10, Λ = 300
D7a, DM mass = 100, Λ = 100
D7a, DM mass = 100, Λ = 400
D7a, DM mass = 1000, Λ = 200
D7a, DM mass = 1000, Λ = 500

- Large range of p-values (Some so small they don't show up on plot).
- Exclude region at high EFT scale and high DM mass.

Observable phase space plots : Mjj : D5d





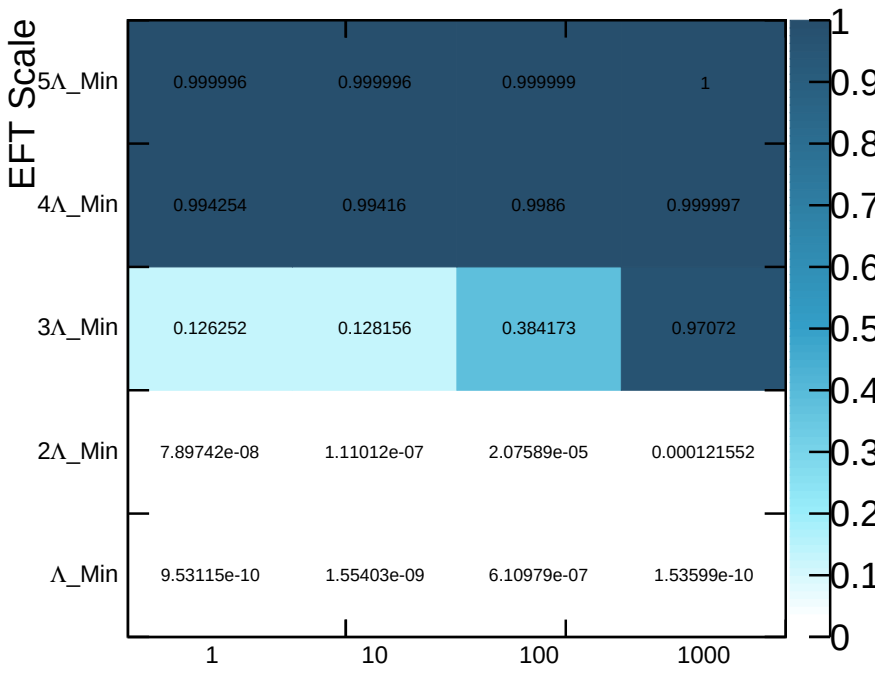
MG SM
D5d, DM mass = 1, Λ = 19800
D5d, DM mass = 10, Λ = 6600
D5d, DM mass = 10, Λ = 26400
D5d, DM mass = 100, Λ = 13200
D5d, DM mass = 100, Λ = 33000
D5d, DM mass = 1000, Λ = 19800

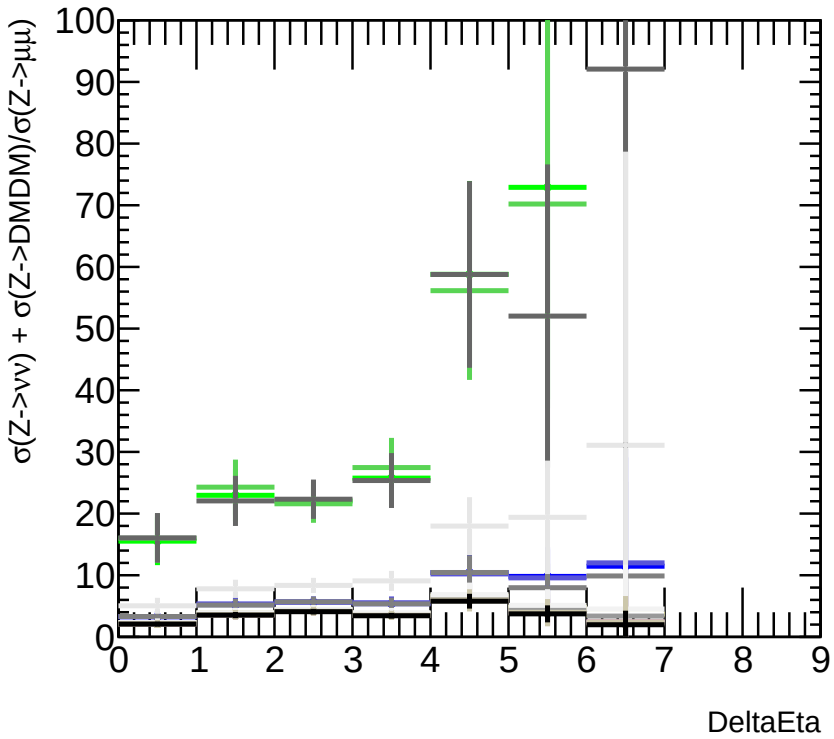
D5d, DM mass = 1, Λ = 6600
D5d, DM mass = 1, Λ = 26400
D5d, DM mass = 10, Λ = 13200
D5d, DM mass = 10, Λ = 33000
D5d, DM mass = 100, Λ = 19800
D5d, DM mass = 1000, Λ = 6600
D5d, DM mass = 1000, Λ = 26400

D5d, DM mass = 1, Λ = 13200
D5d, DM mass = 1, Λ = 33000
D5d, DM mass = 10, Λ = 19800
D5d, DM mass = 100, Λ = 6600
D5d, DM mass = 100, Λ = 26400
D5d, DM mass = 1000, Λ = 13200
D5d, DM mass = 1000, Λ = 33000

- All p-values here are 1 as they are so close to the SM due to the EFT scale constraint.

Observable phase space plots : $\Delta\eta$: D7a





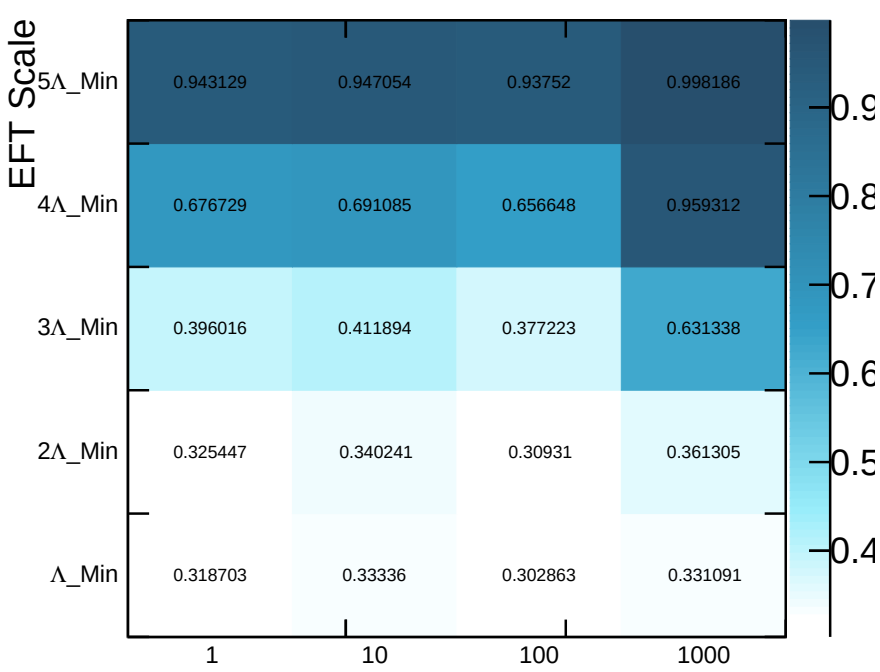
MG SM
D7a, DM mass = 1, Λ = 300
D7a, DM mass = 10, Λ = 100
D7a, DM mass = 10, Λ = 400
D7a, DM mass = 100, Λ = 200
D7a, DM mass = 100, Λ = 500
D7a, DM mass = 1000, Λ = 300

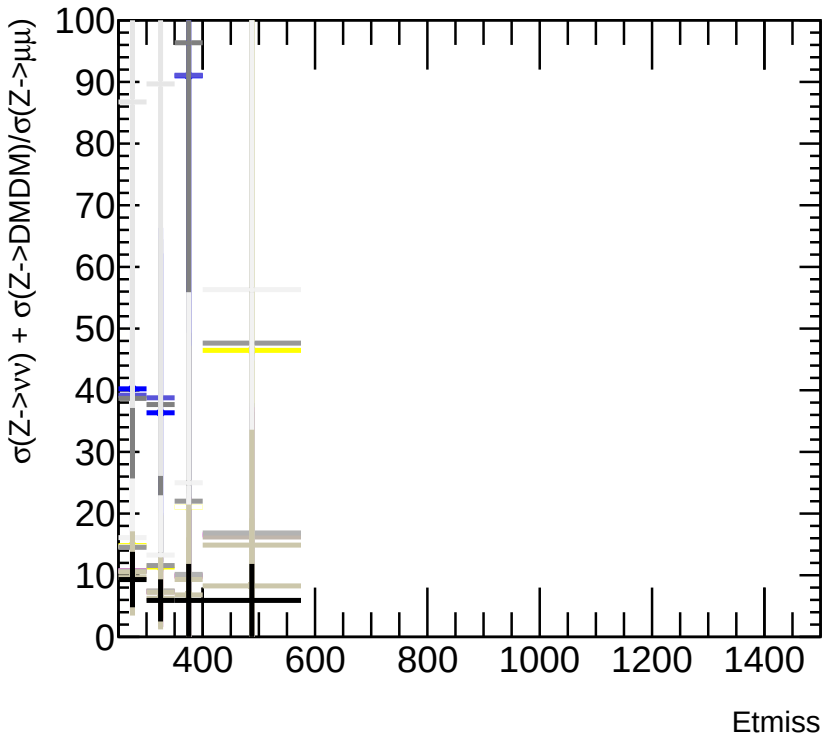
D7a, DM mass = 1, Λ = 100
D7a, DM mass = 1, Λ = 400
D7a, DM mass = 10, Λ = 200
D7a, DM mass = 10, Λ = 500
D7a, DM mass = 100, Λ = 300
D7a, DM mass = 1000, Λ = 100
D7a, DM mass = 1000, Λ = 400

D7a, DM mass = 1, Λ = 200
D7a, DM mass = 1, Λ = 500
D7a, DM mass = 10, Λ = 300
D7a, DM mass = 100, Λ = 100
D7a, DM mass = 100, Λ = 400
D7a, DM mass = 1000, Λ = 200
D7a, DM mass = 1000, Λ = 500

- Again a large range of p-values.
- Exclude region at high EFT scale and high DM mass.
- Gives better exclusion than Mjj, but still in same area.

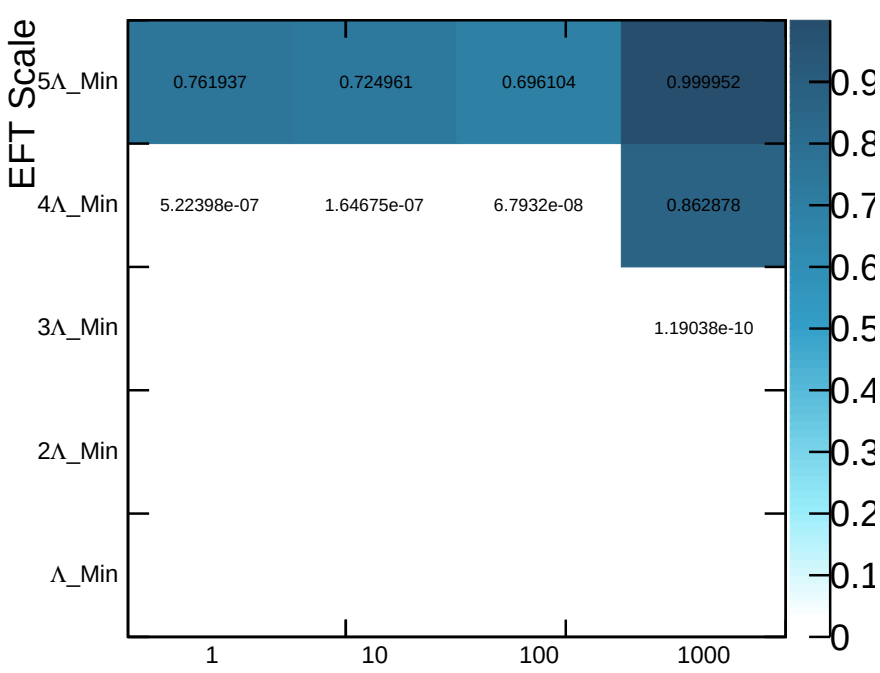
Observable phase space plots : $\not{E}_T$: D7a

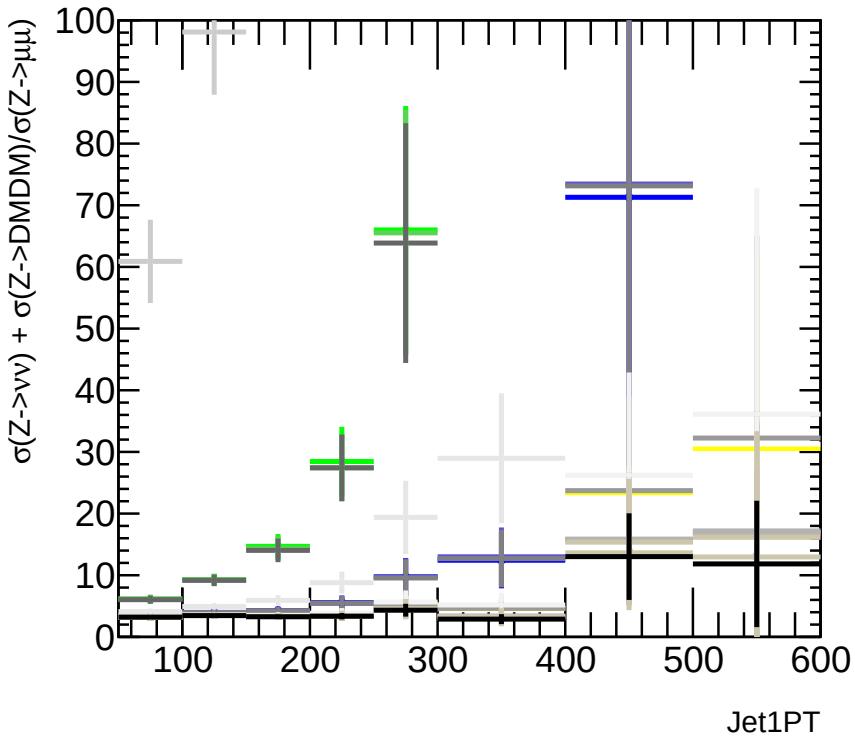




- Again a large range of p-values.
- Exclude region at high EFT scale and high DM mass.
- Gives more varied exclusion than Mjj or $\Delta\eta$, but still in same area.

Observable phase space plots : Jet 1 pT : D7a





MG SM
D7a, DM mass = 1, Λ = 300
D7a, DM mass = 10, Λ = 100
D7a, DM mass = 10, Λ = 400
D7a, DM mass = 100, Λ = 200
D7a, DM mass = 100, Λ = 500
D7a, DM mass = 1000, Λ = 300
D7a, DM mass = 1, Λ = 100
D7a, DM mass = 1, Λ = 400
D7a, DM mass = 10, Λ = 200
D7a, DM mass = 10, Λ = 500
D7a, DM mass = 100, Λ = 300
D7a, DM mass = 1000, Λ = 100
D7a, DM mass = 1000, Λ = 400
D7a, DM mass = 1, Λ = 200
D7a, DM mass = 1, Λ = 500
D7a, DM mass = 10, Λ = 300
D7a, DM mass = 100, Λ = 100
D7a, DM mass = 100, Λ = 400
D7a, DM mass = 1000, Λ = 200
D7a, DM mass = 1000, Λ = 500

- Again a large range of p-values.
- Exclude region at high EFT scale and high DM mass.
- Very similar exclusion to Mjj.