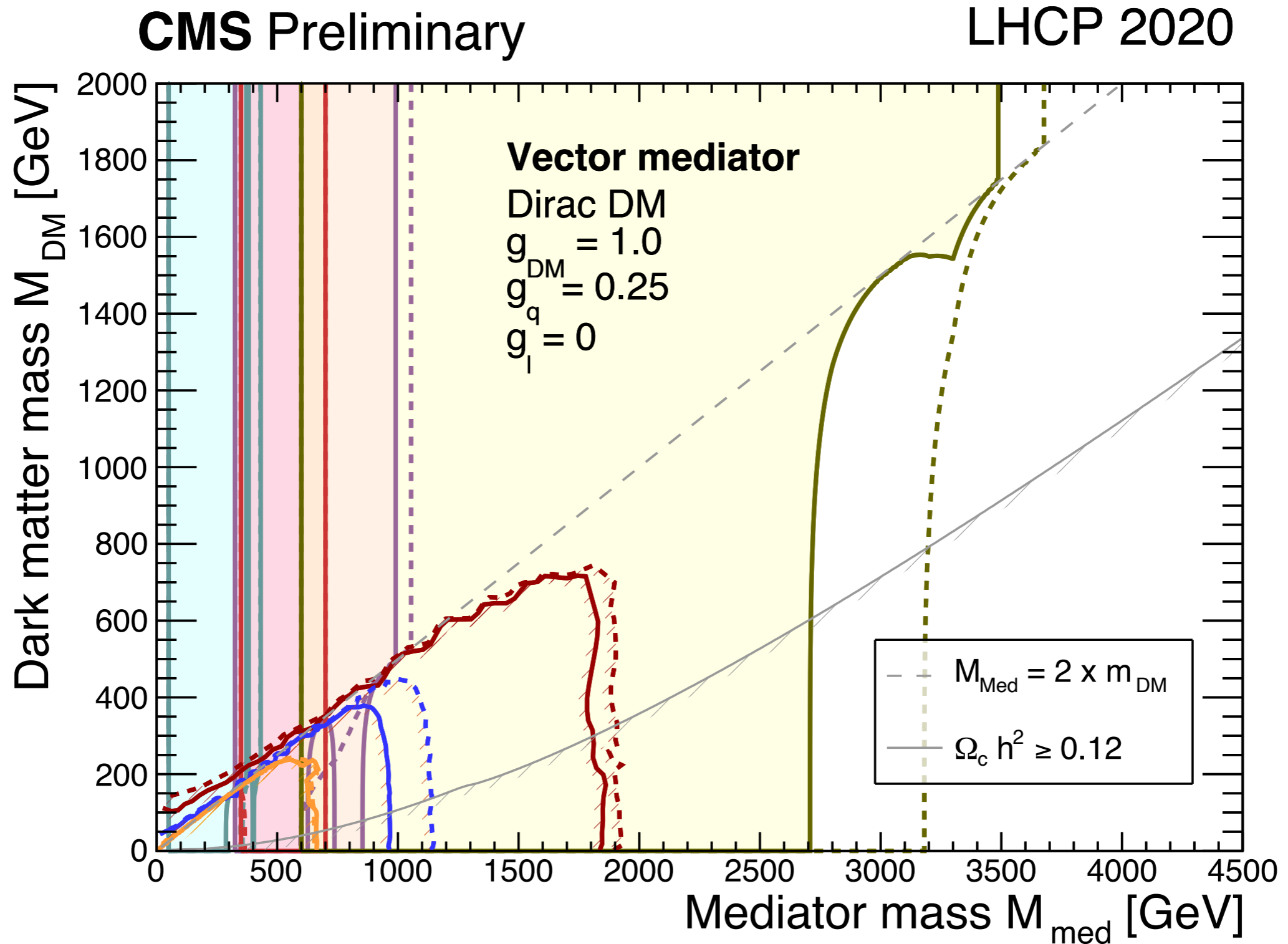




A few thoughts on the spin-0 goals

Kate Pachal

For spin-1 we know what the goal is:

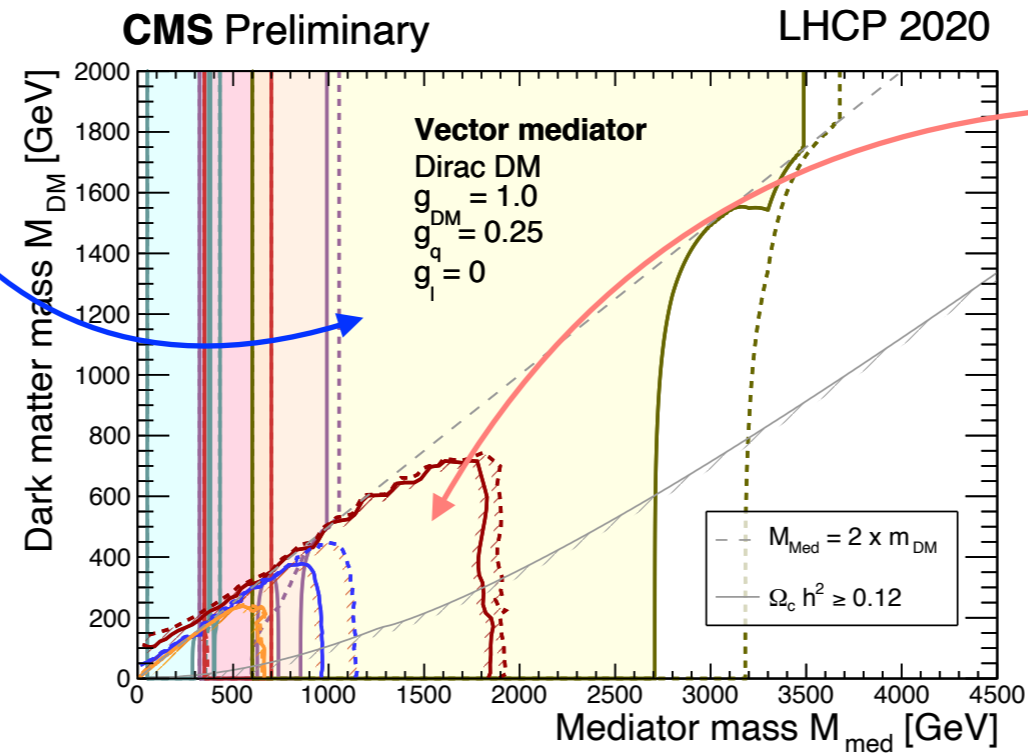


Two categories of rescaling methods

- **Resonant**: just scaling with on-shell approximation based on widths

- Should **translate directly** to spin-0 with no problem

- Main caveat is width-based: for large widths, changing couplings changes acceptance. Spin-0 is actually narrower in general so anticipate this will work fine



- **MET+X**: rescaling method depends on cross section approximation for single LO s-channel diagram

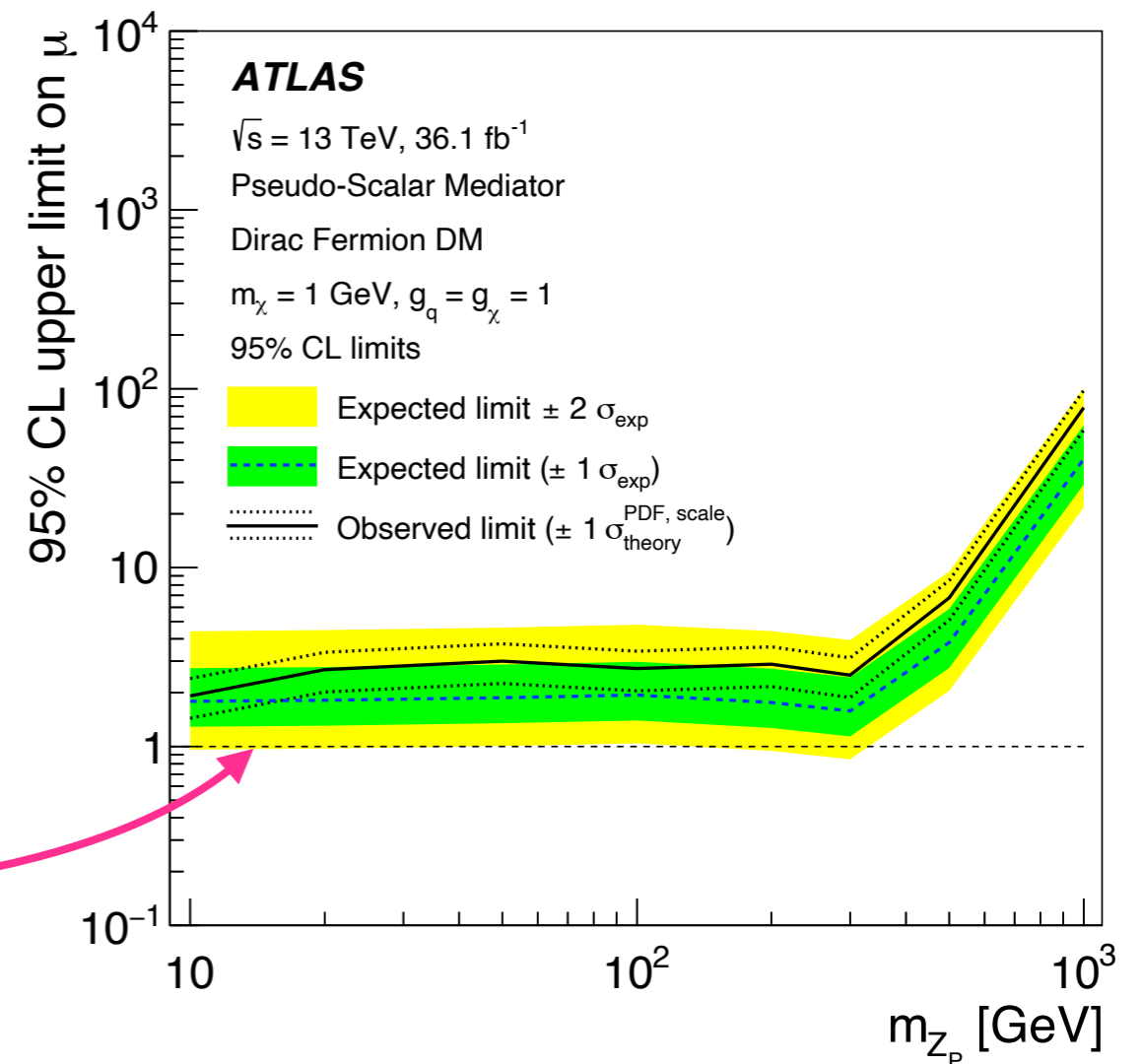
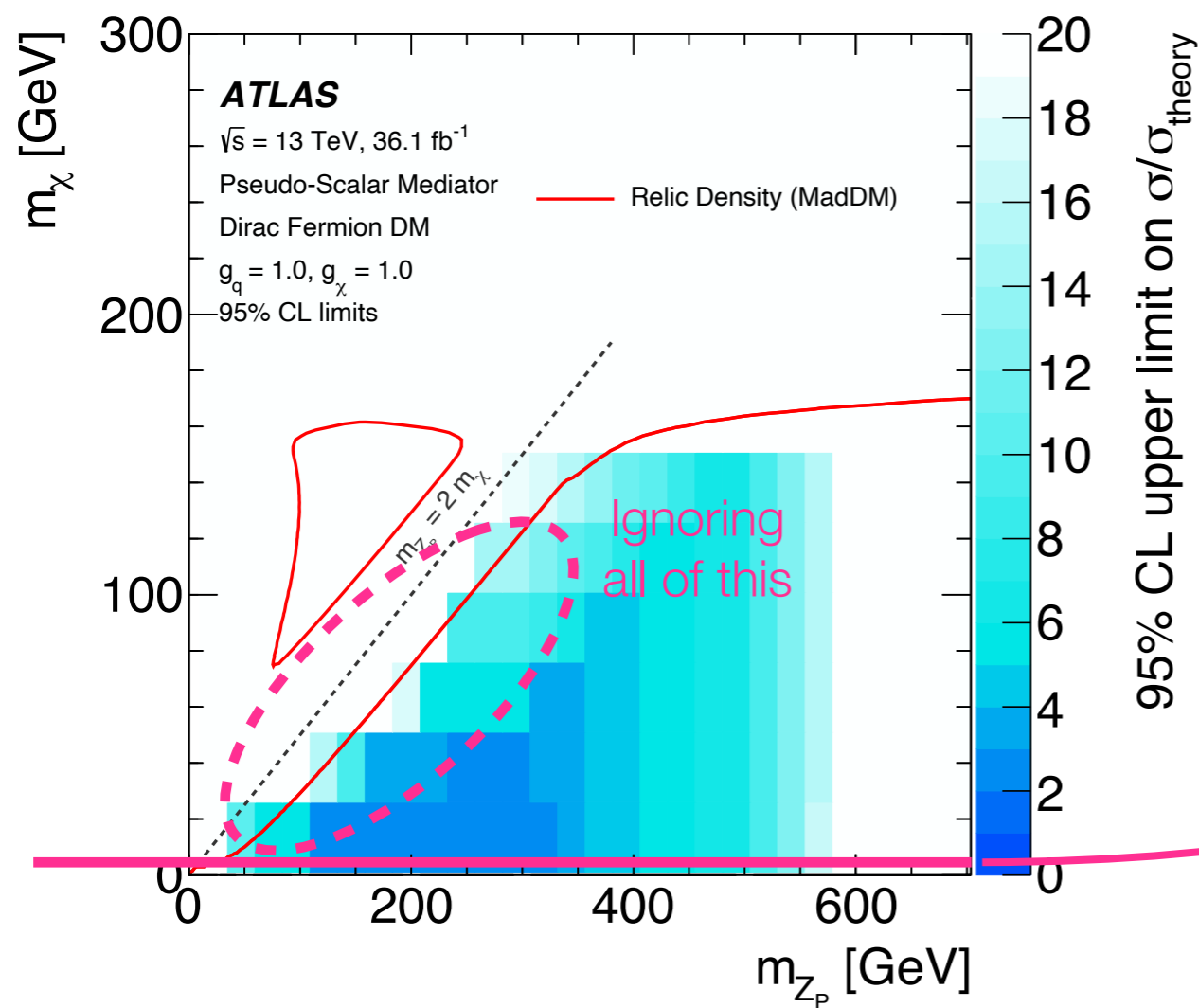
- Only need this to handle presence of **off-shell sensitivity**

and transition region nearby

- May not translate obviously to spin-0 depending on processes/diagrams involved - has not been tested at all yet

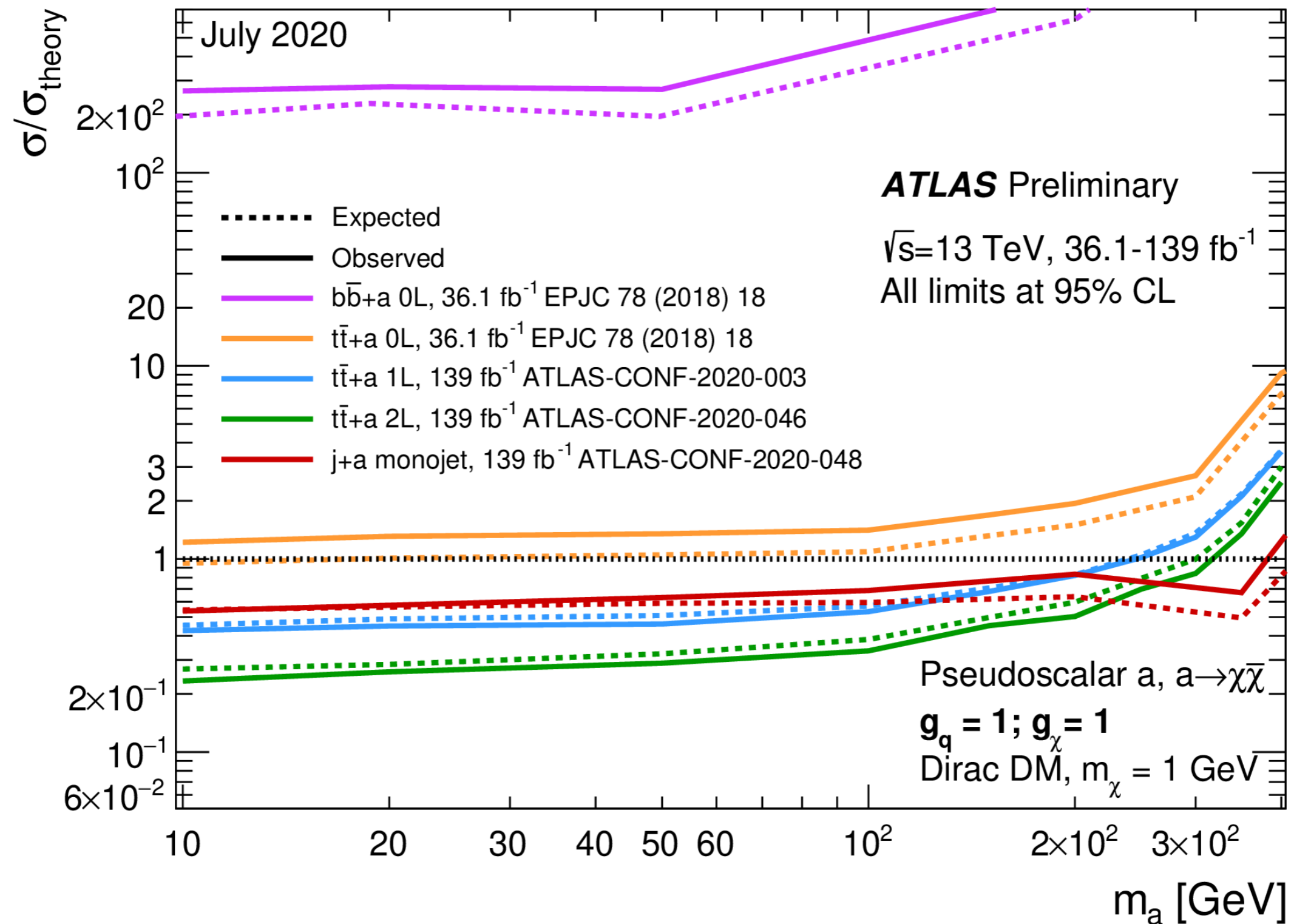
So for spin 0, *what is the goal?*

- Our typical scalar/pseudoscalar limits are presented as 1D slices through the kind of plane in we show spin-1



- Note 1D limit plot starts at 10 GeV with $m_\chi = 1$: solidly on-shell everywhere that we are currently showing the limits

Summary plots follow the same format



Conclusion

- If these kinds of plots are all either experiment ever wants to make, we are probably already good to go
 - Can just use on-shell approximations similar to dijet resonance method everywhere
- Given same production modes for scalar and pseudoscalar, also fine to scale from one model to the other within this approximation
- If we want to make the full 2D plane we ought to do some more serious studies and make sure we have an approach that works, as this has (AFAIK) never been looked at. Possible MET+X method will work but needs confirmation.