HSCP Recasting
ATLAS-SUSY-2018-42

André Lessa
(UFABC – Sao Paulo)

LLP13

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HSCP Searches

- HSCP searches are very inclusive and can be applied to a variety of models.
- Recasting of these searches can be extremely useful for the pheno community.
- The previous ATLAS result (SUSY-2016-32) has been succesfully recast and used in several pheno studies
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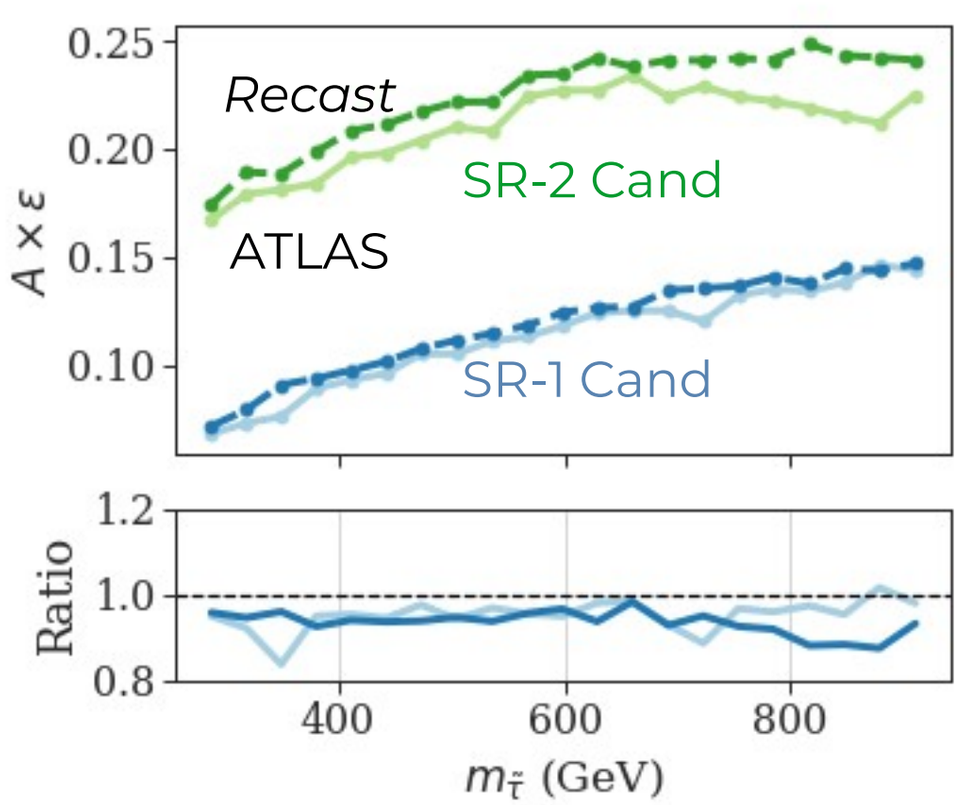

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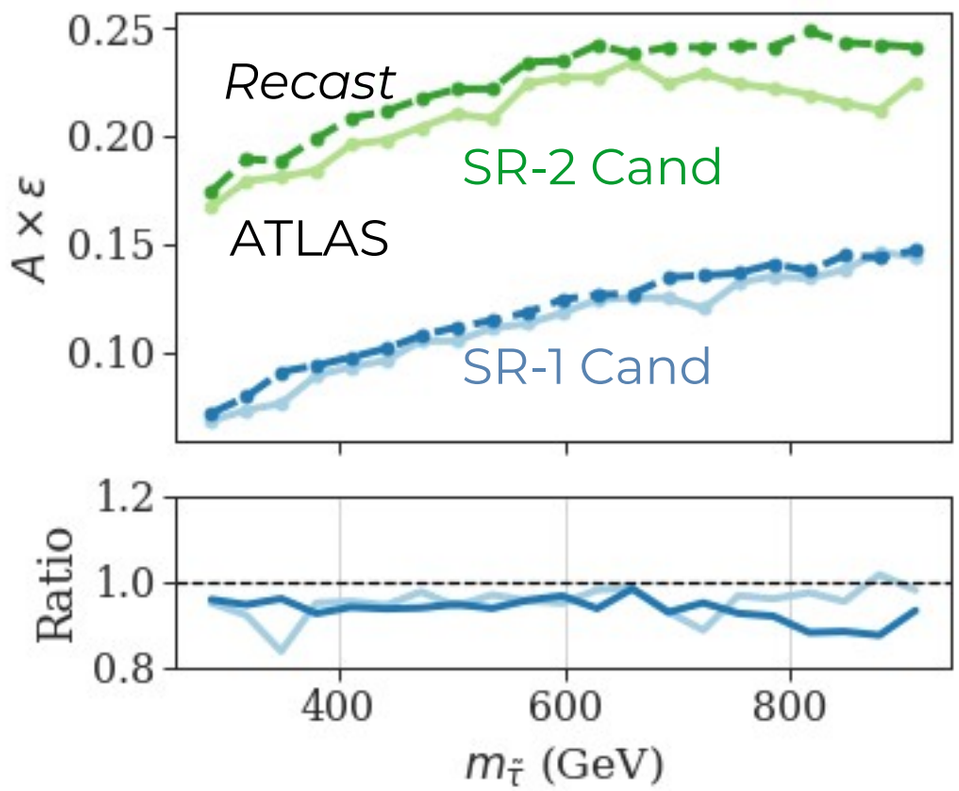
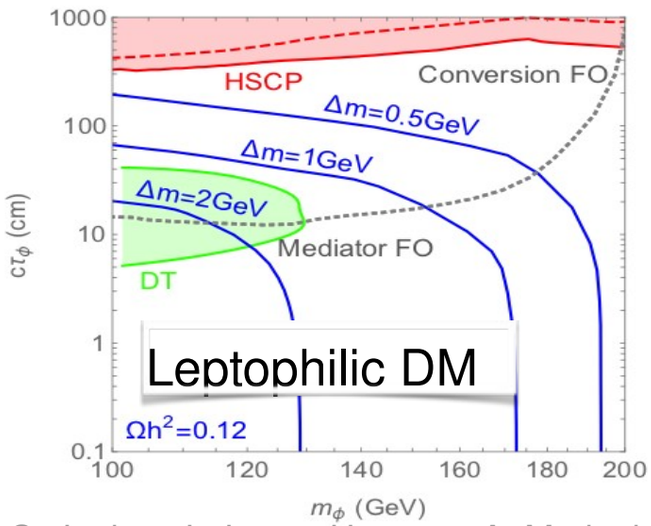
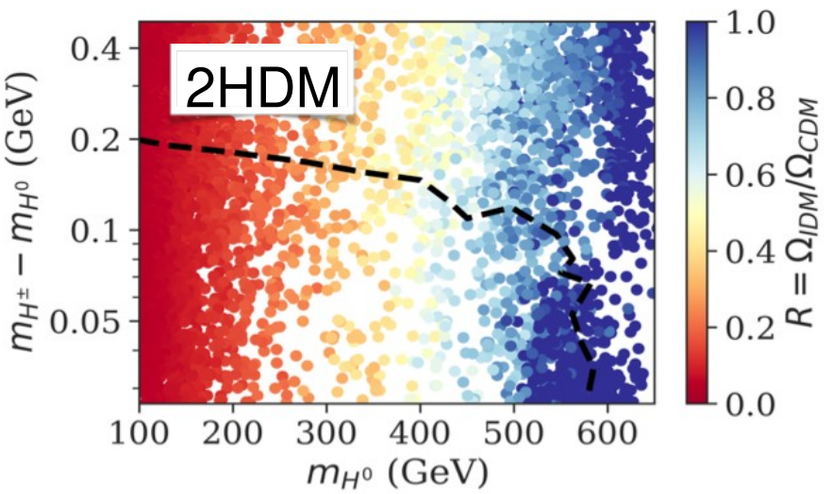




S. Junius, L. Lopez-Honorez, A. Mariotti., JHEP 1907 136



J. Heisig, S. Kraml, AL ,Phys.Lett. B788 (2019)

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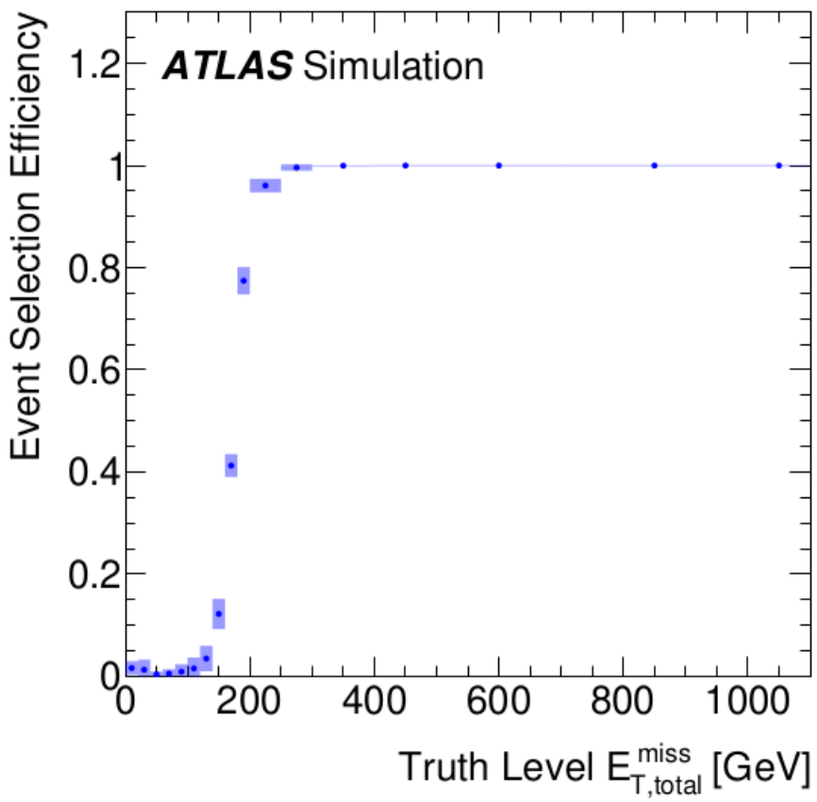

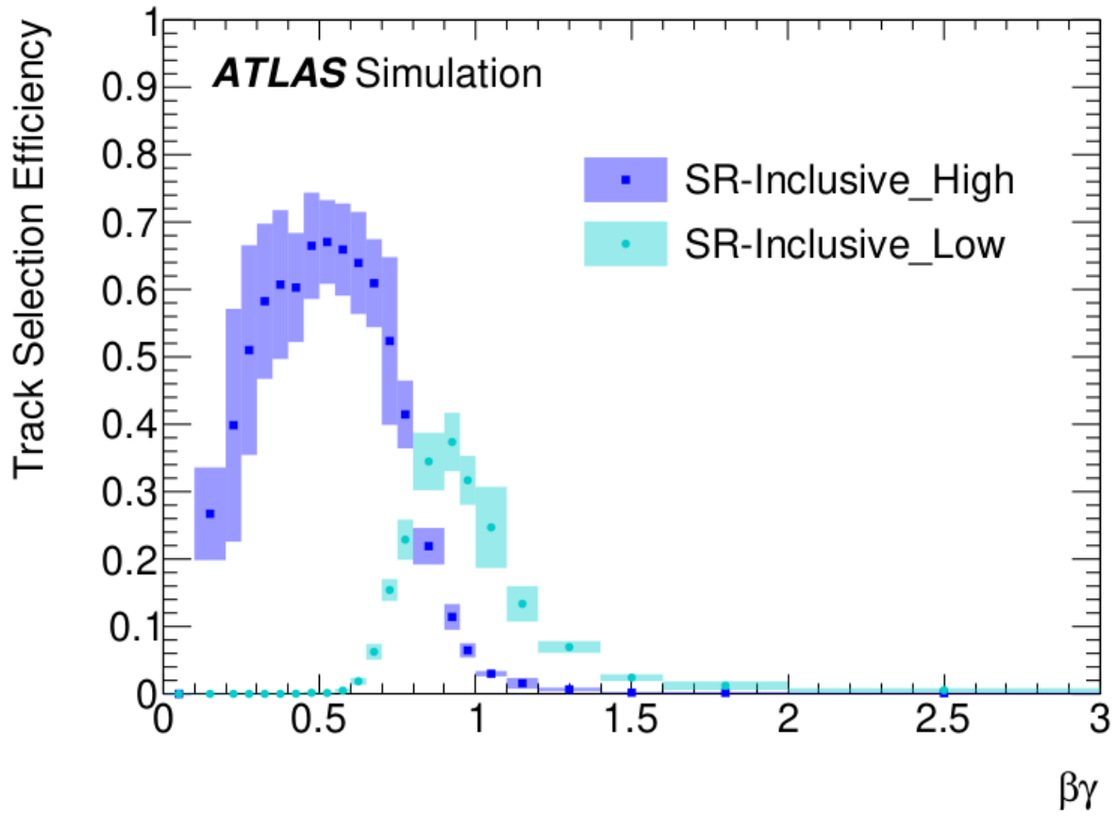

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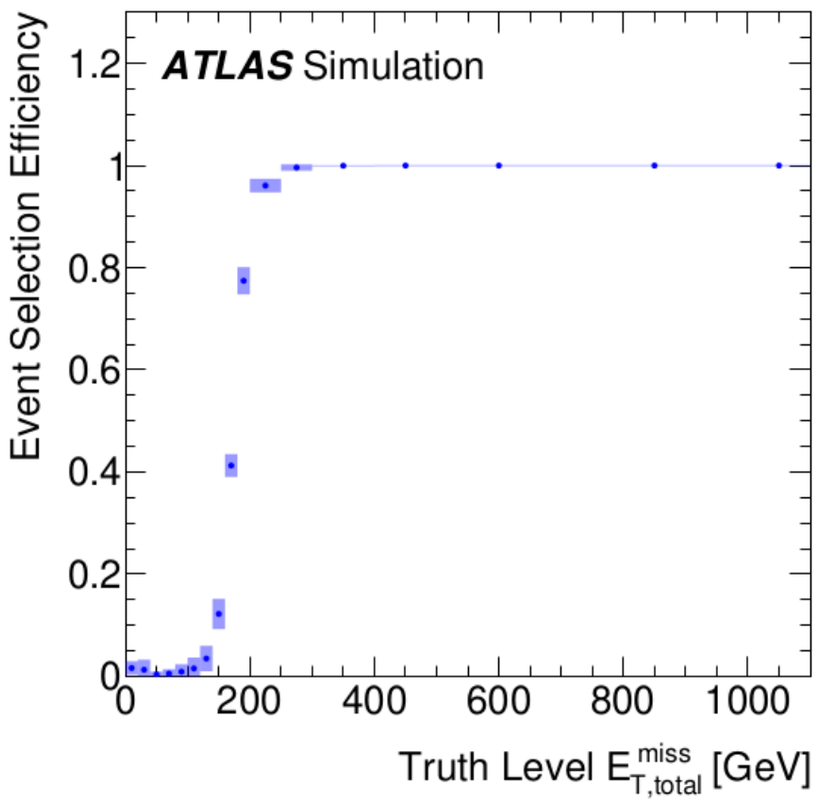

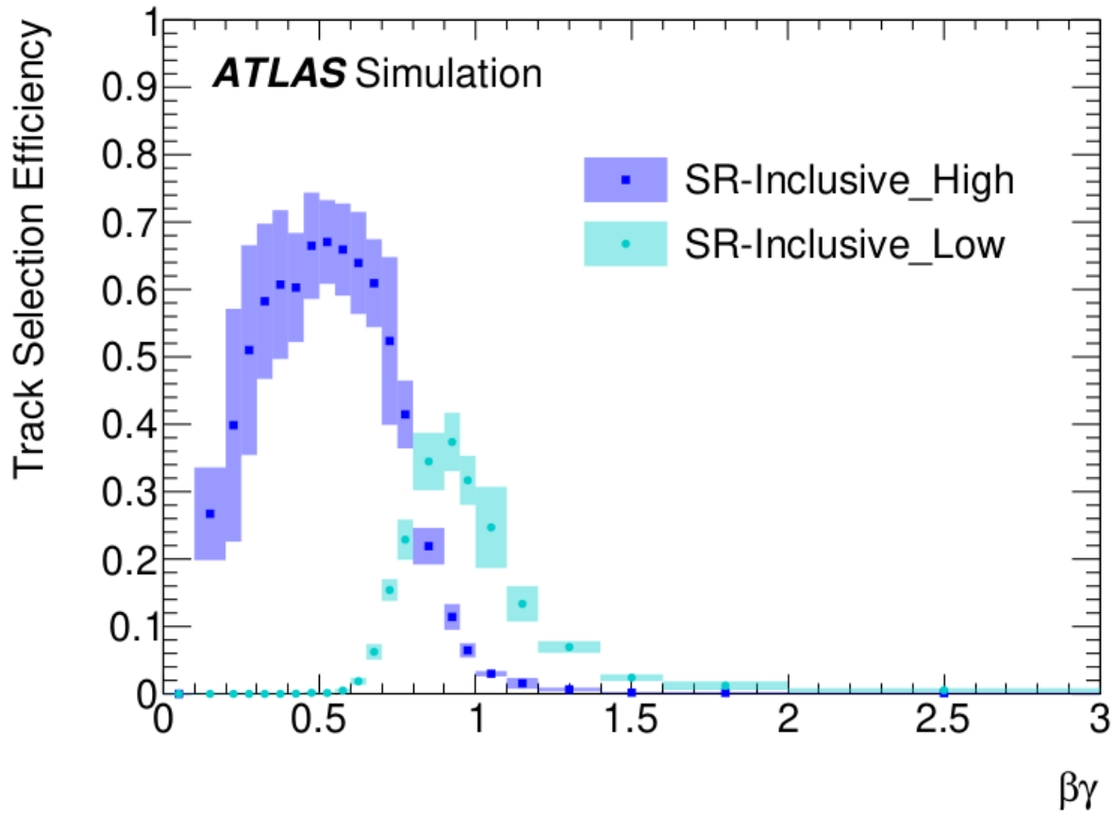

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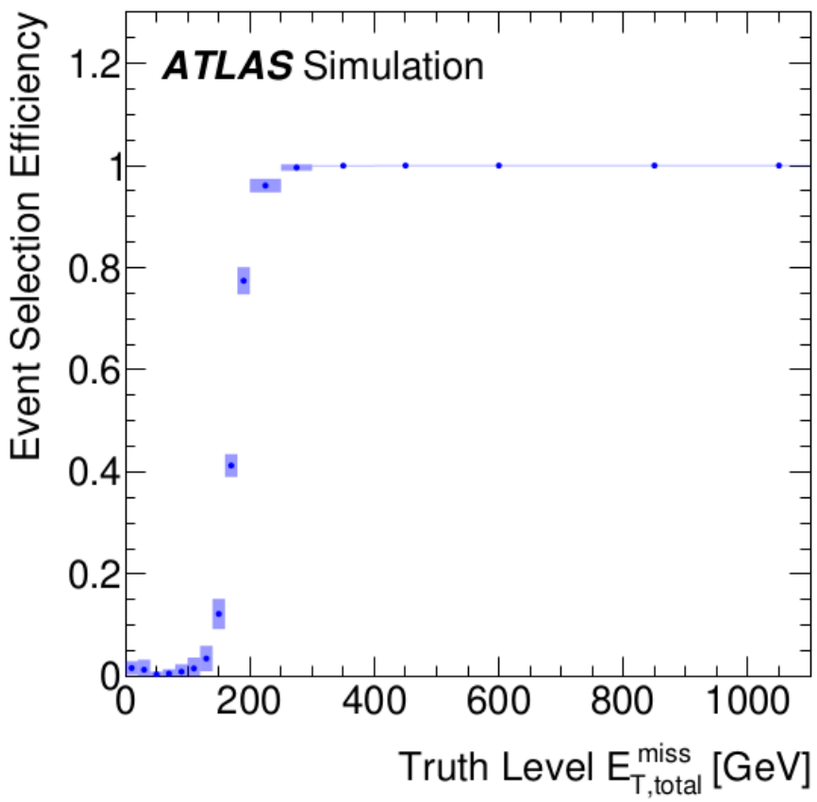

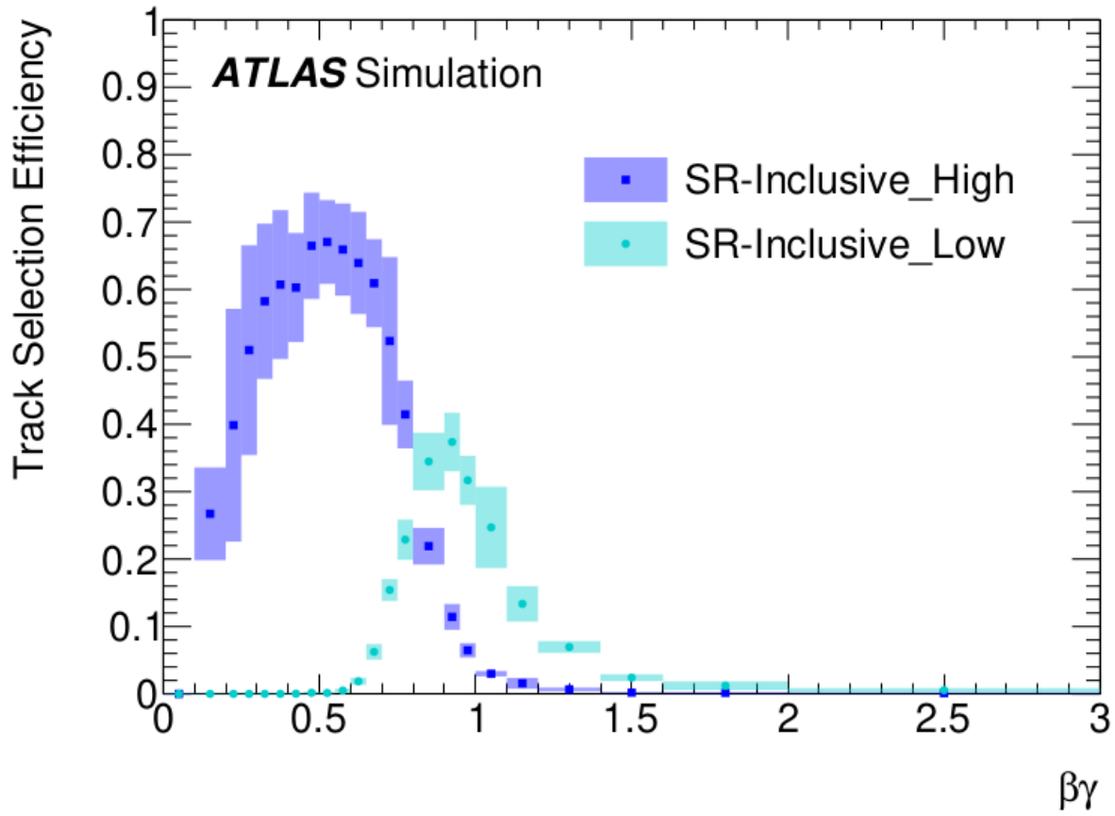

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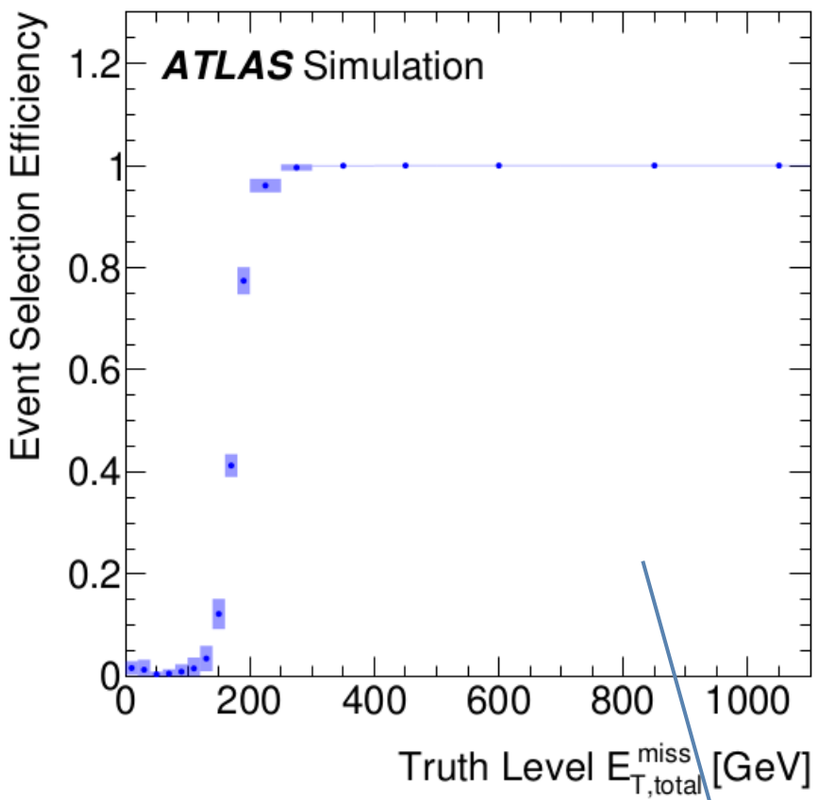

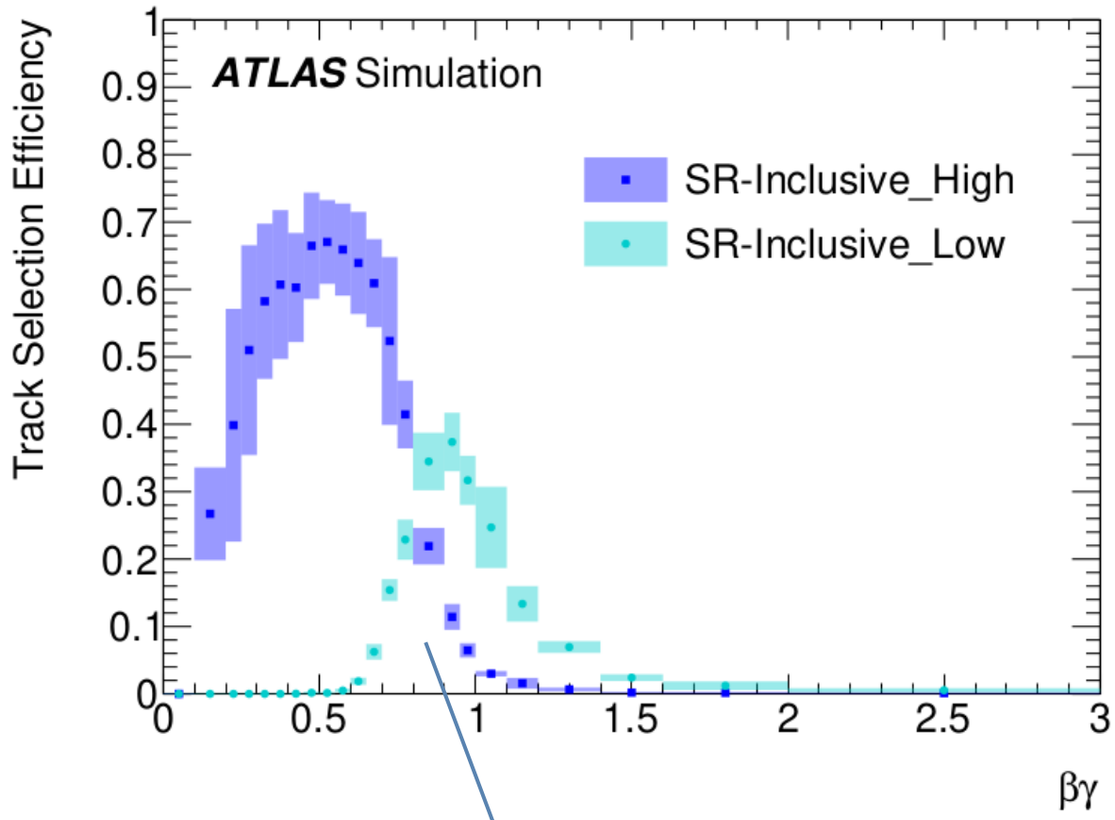

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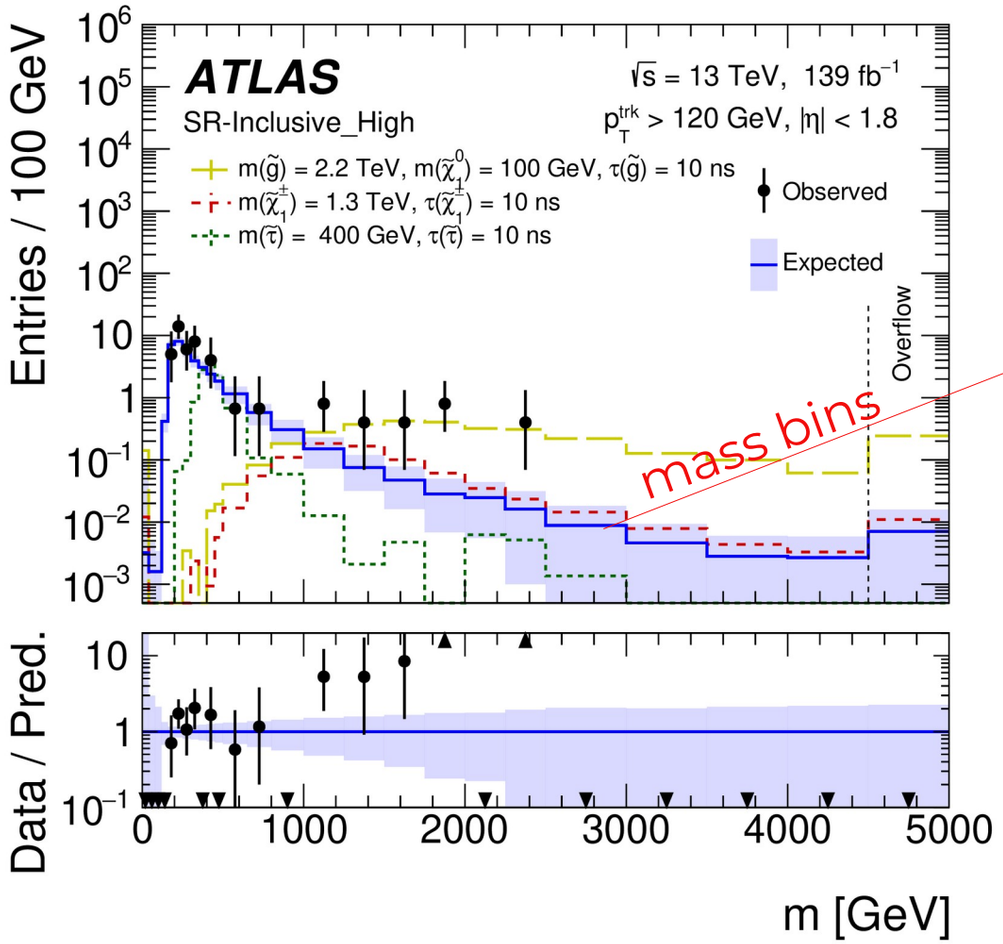

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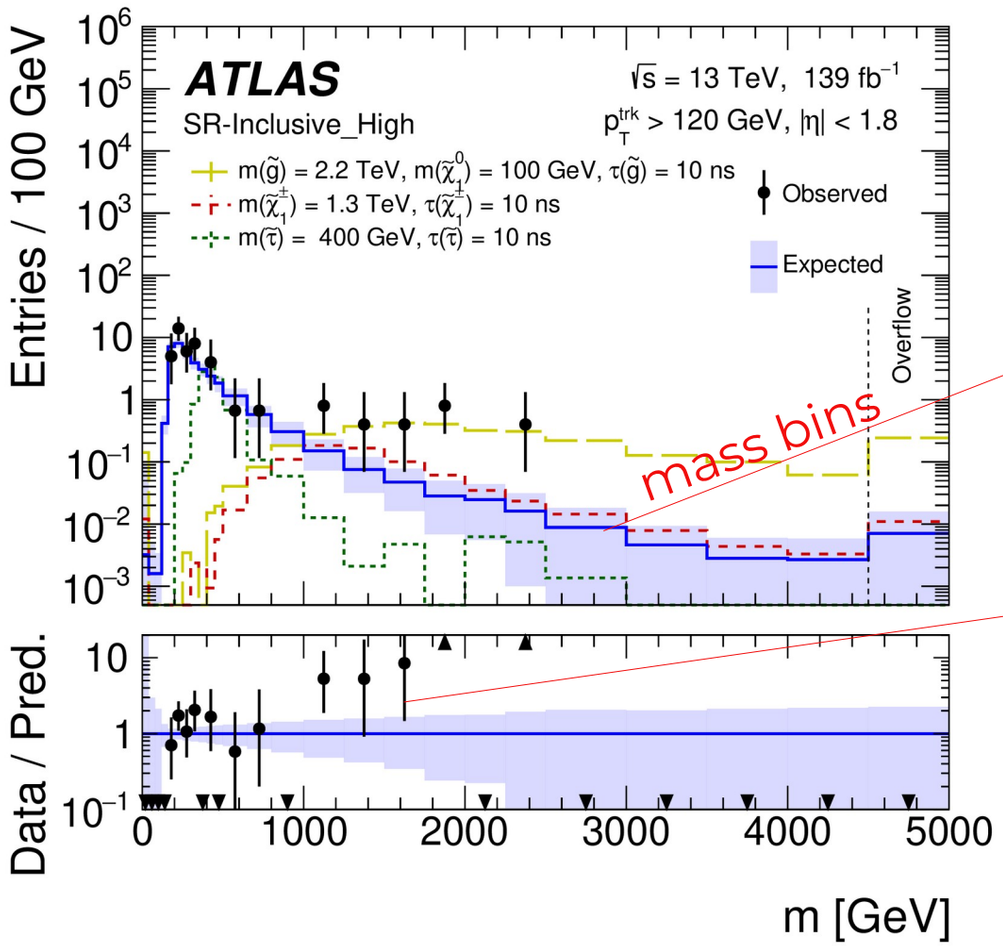

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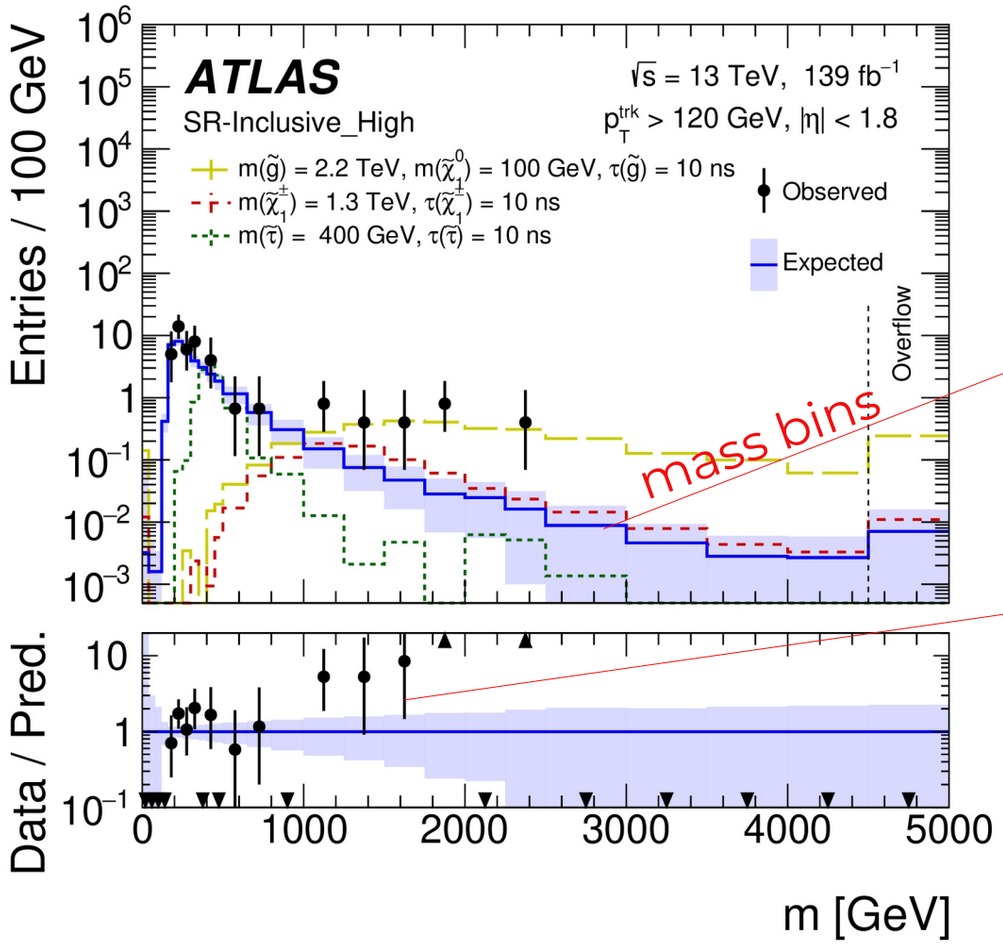

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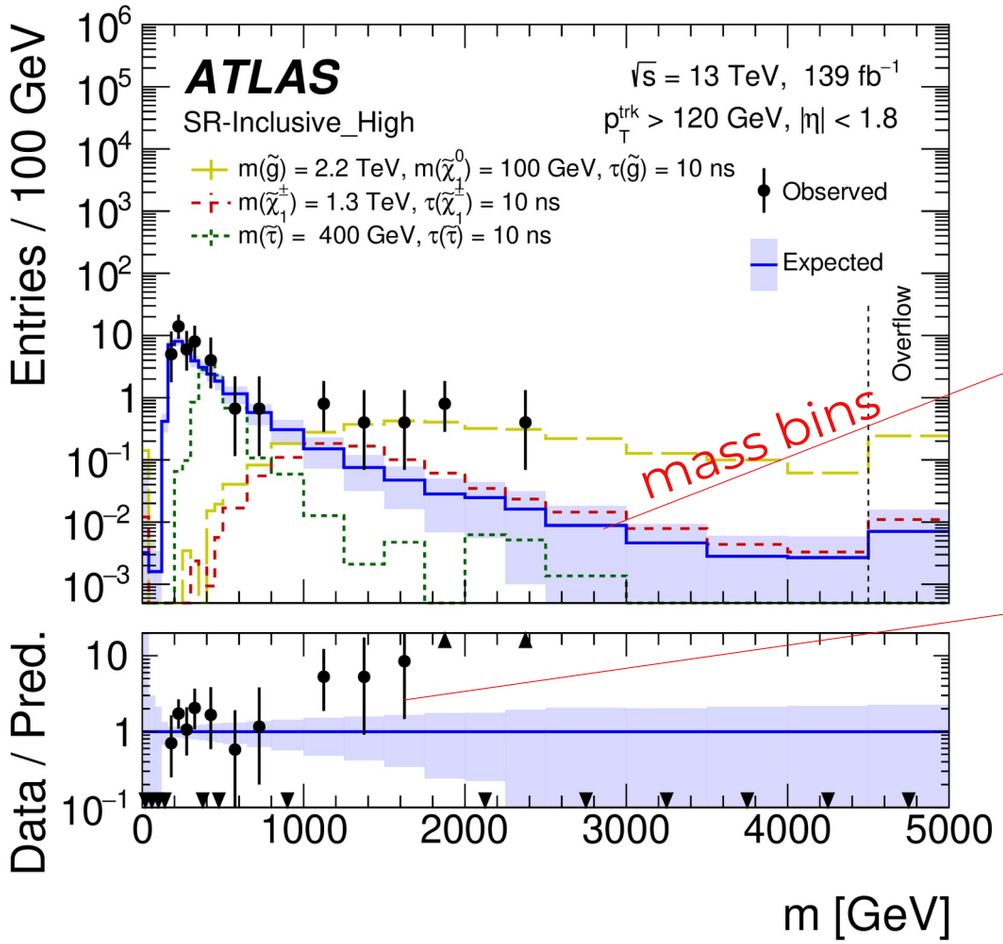

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- Recasting prescription:
  - use the mass window for the target mass closest to m_{LLP}
  - Apply a mass window efficiency (w_{mass})

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- Validation of recasting material
  - The efficiencies and recasting code are available at (preliminary):

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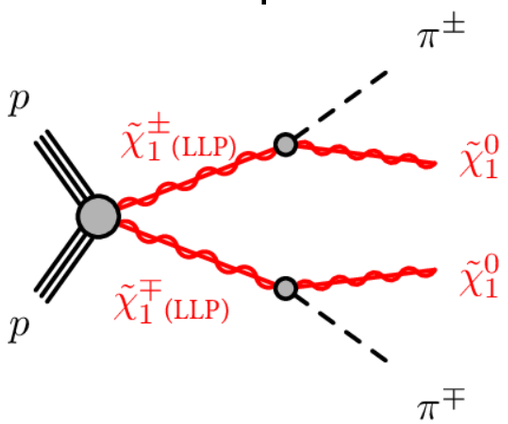

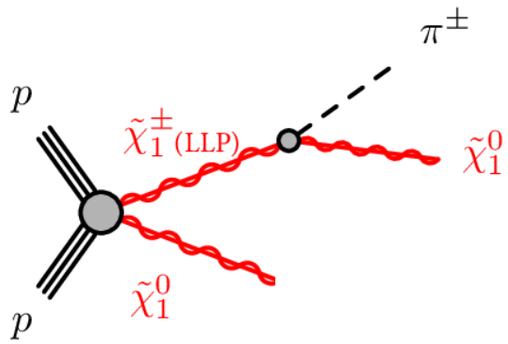

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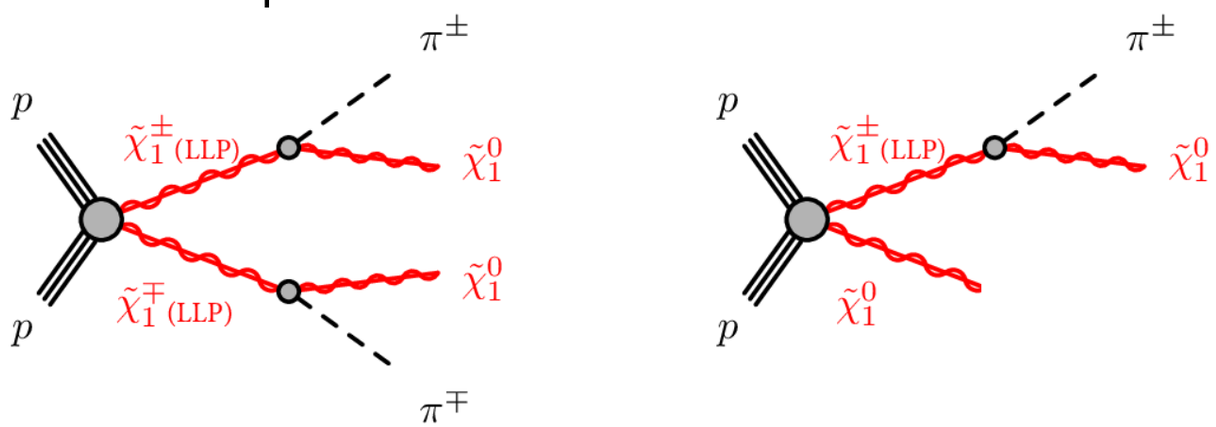

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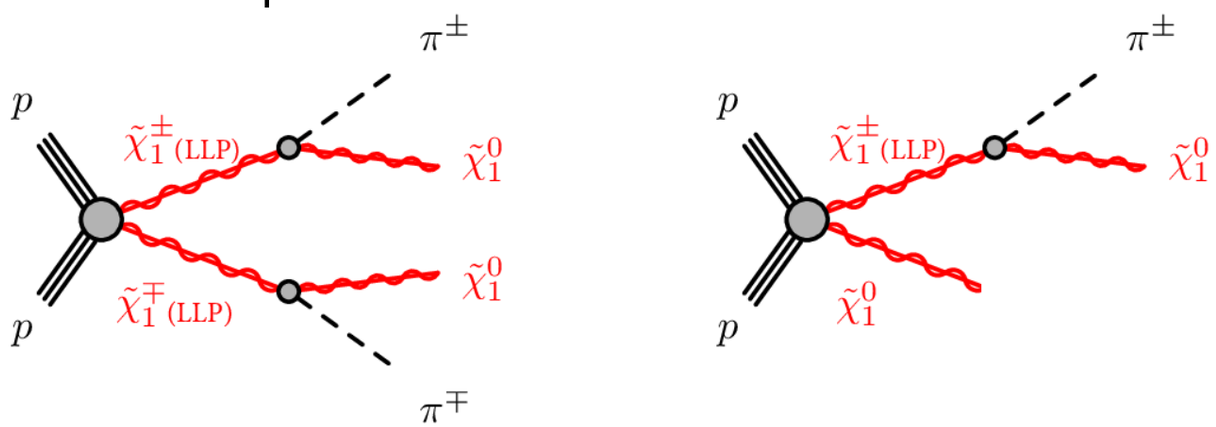

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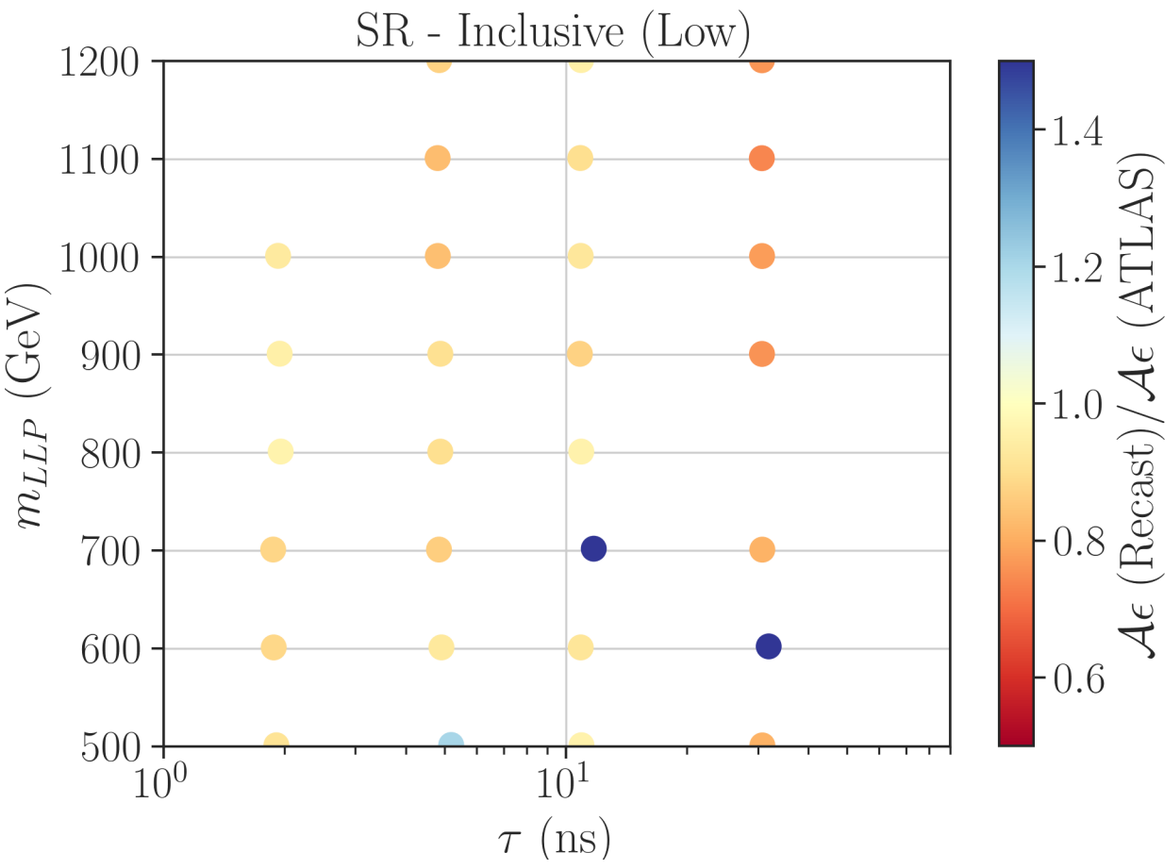
- The procedure works pretty well for recasting $\mathcal{A} \times \epsilon$ (*before* the mass window cut):



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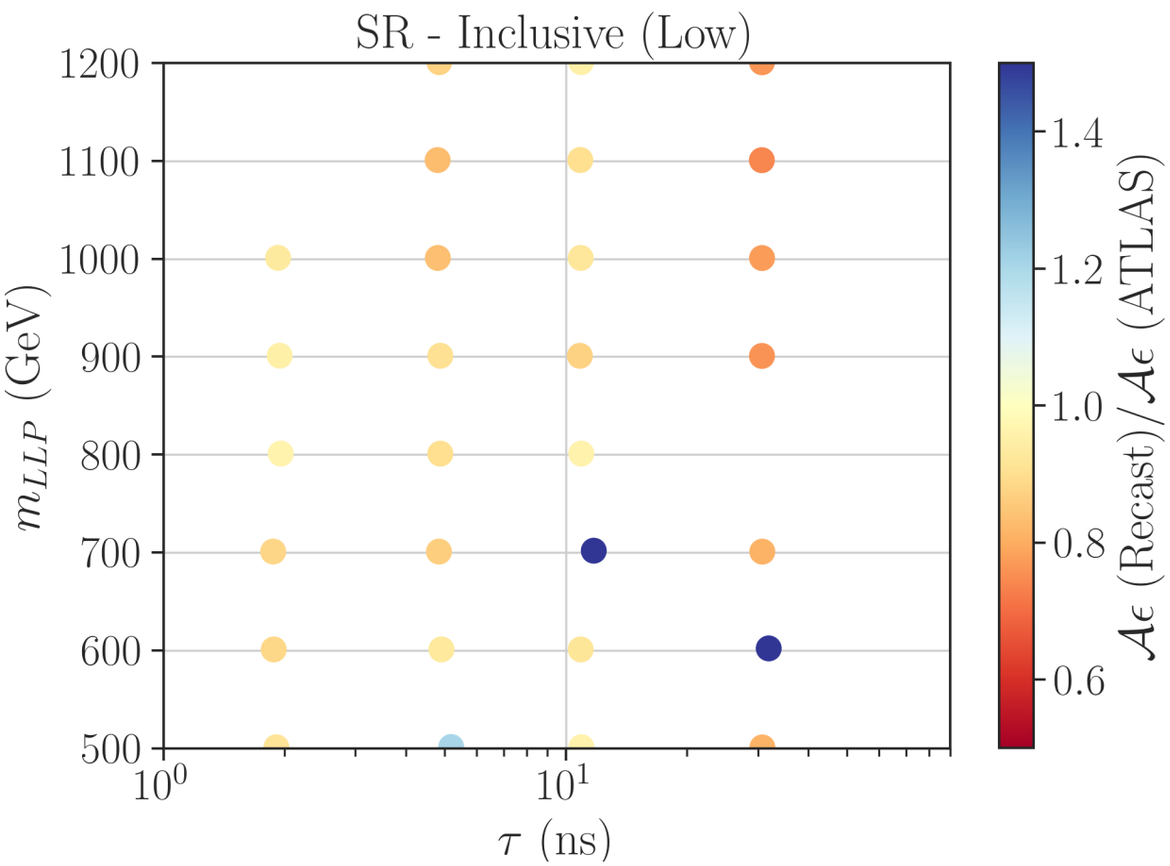

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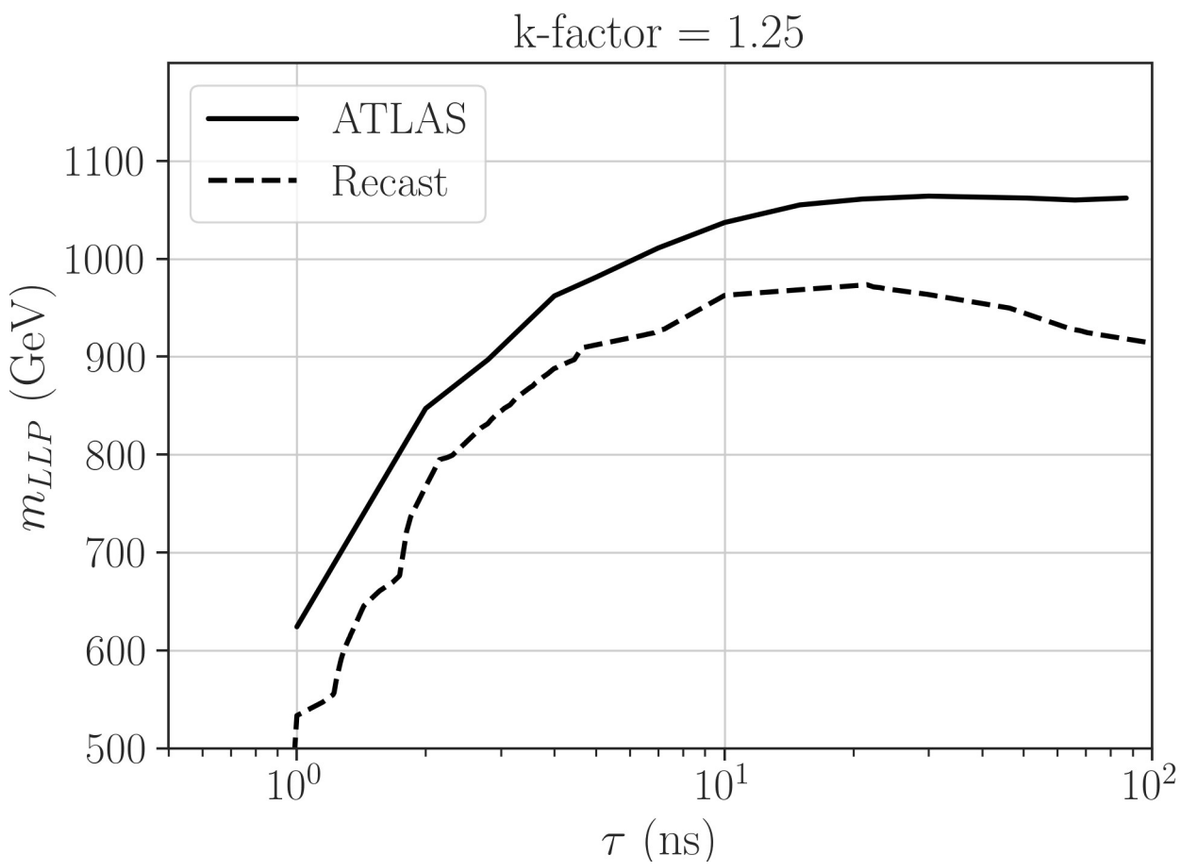

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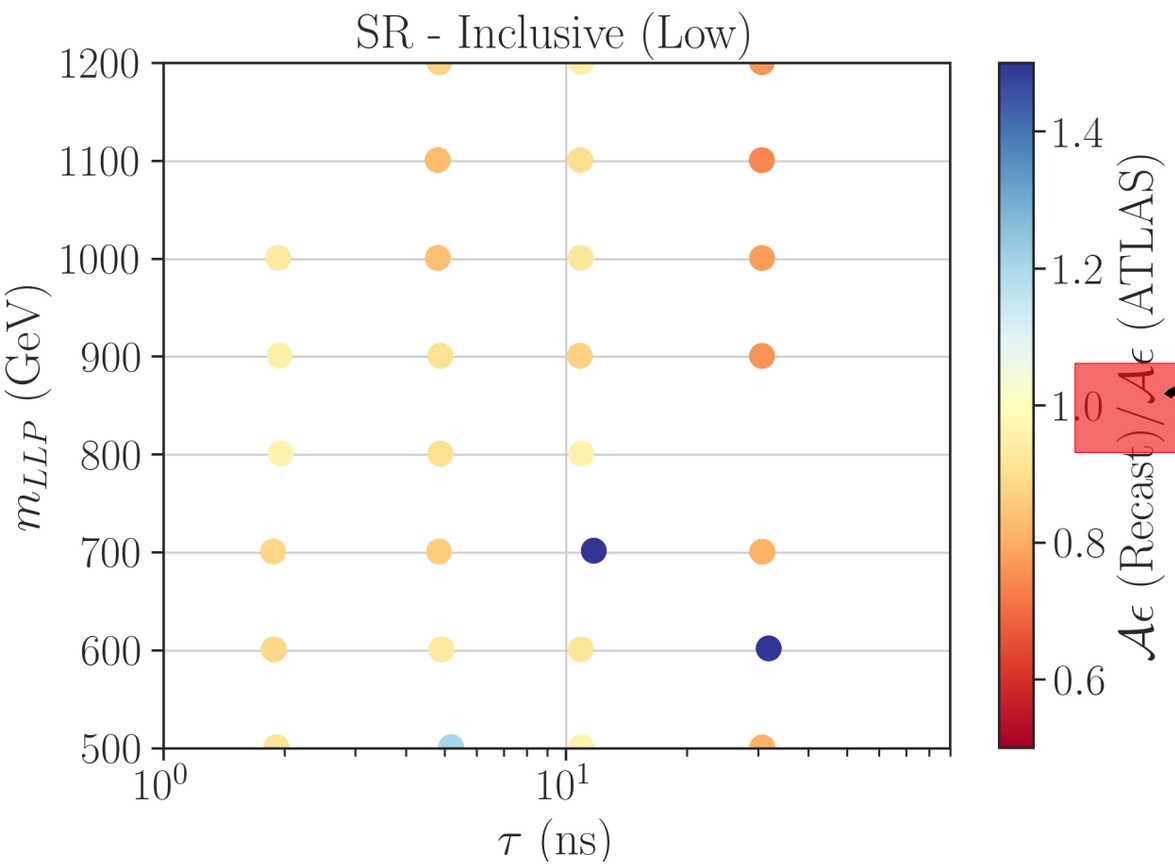

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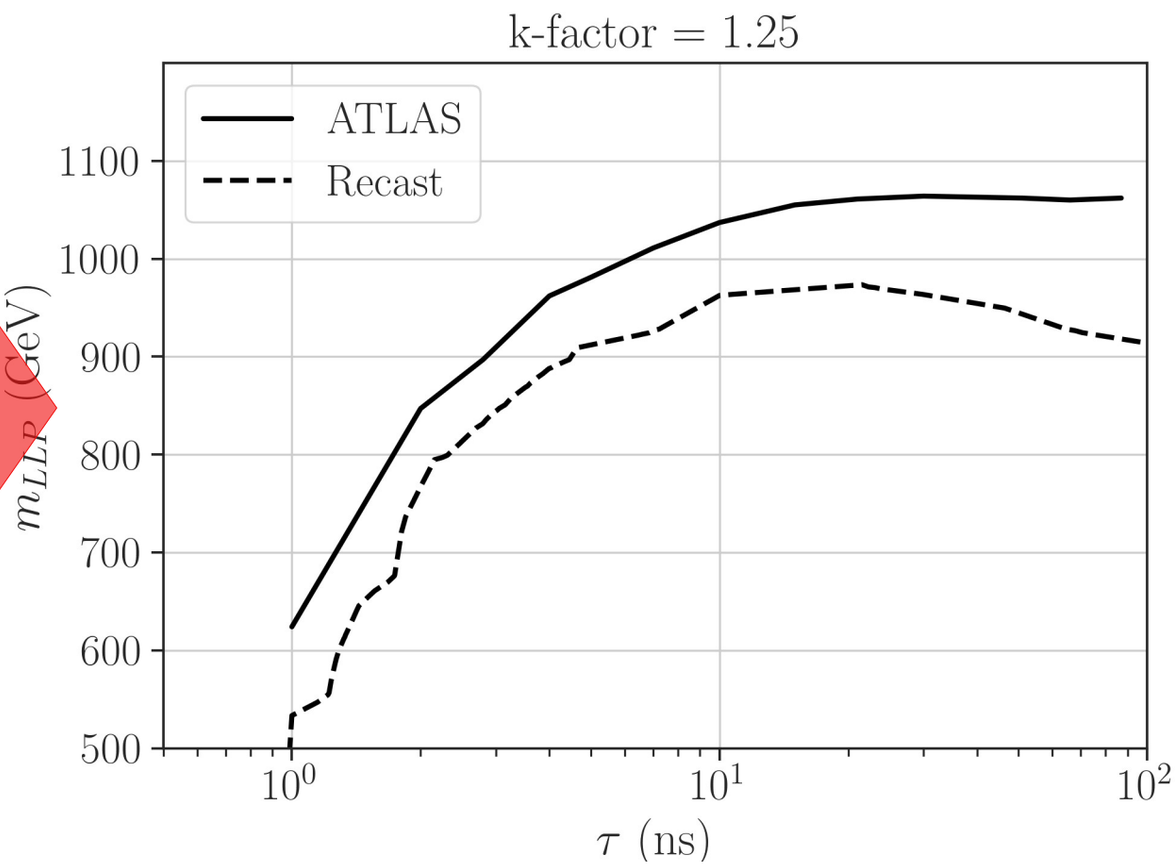

- What could explain the under-exclusion obtained through recasting?

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- In the previous analysis a prescription for smearing the true mass and estimating the reco mass was provided. Seems to work better!

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3. Finally, the info provided only allows to use the inlcusive regions, while the limits are computed using the 6 limit setting SRs:

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SR-Inclusive_High	✓		
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recasting

- When a full recasting is not possible, one option is to provide official efficiencies for the relevant SRs as a function of the SMS parameters (mass, lifetime).

- The reinterpretation material provided efficienci

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  - The provided efficiencies do not include the mass window cut.
  - If we sum over all the mass windows (“inclusive mass”) we can directly use the efficiencies.

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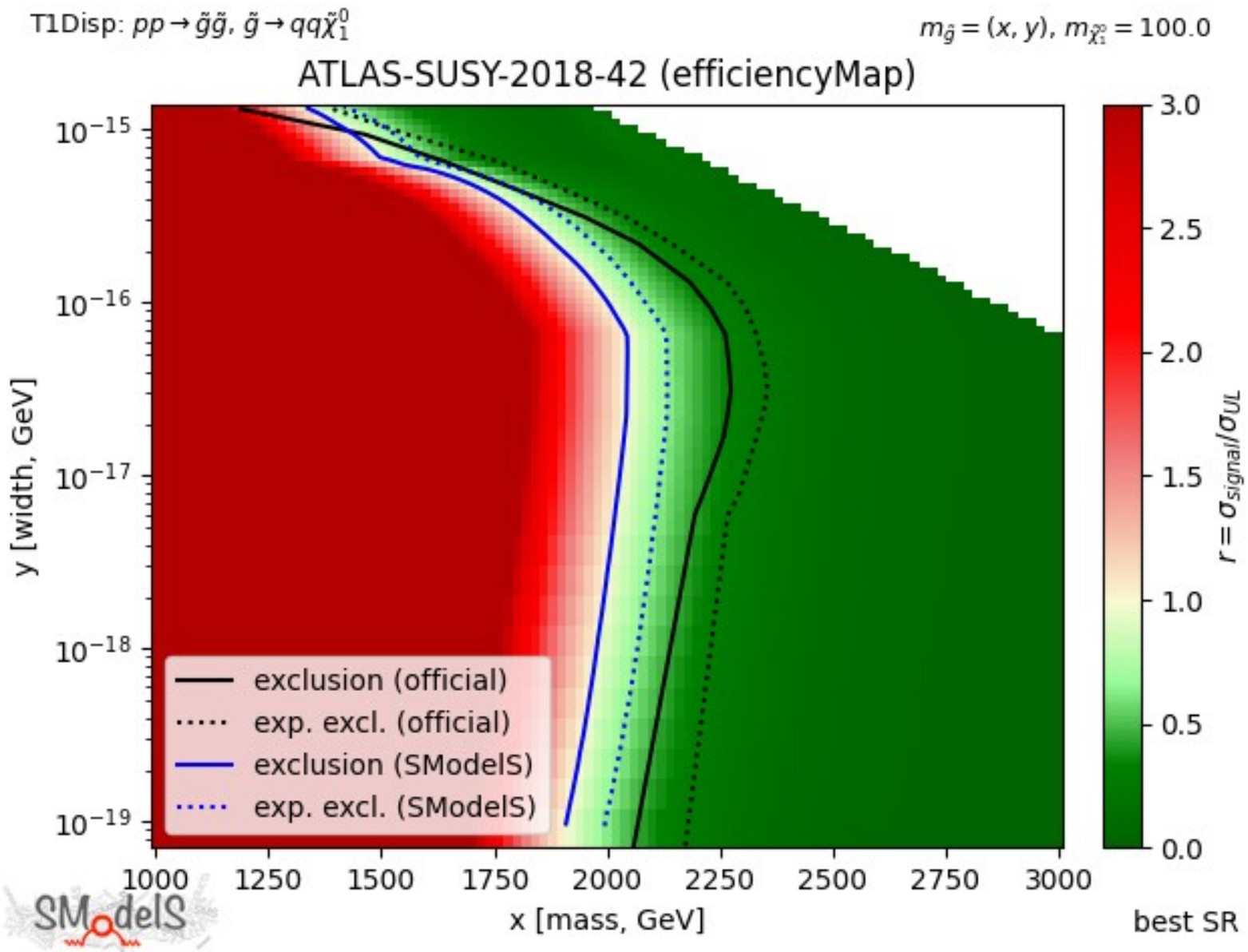

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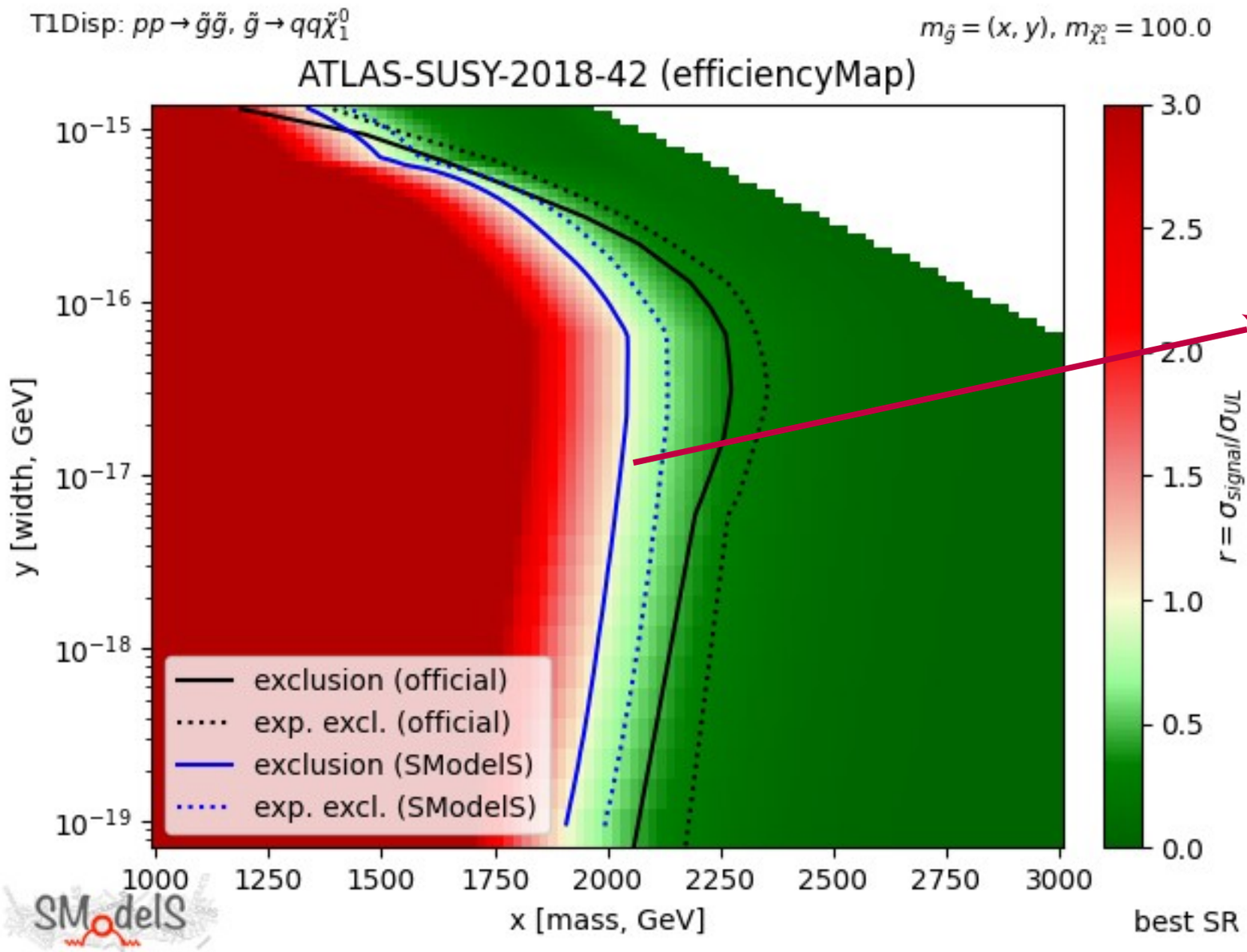

under-exclusion

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