H⁺ interference: Work in Progress

- Setup hMSSM from Riley's paper
  - 633 GeV H+, width 27 GeV.
  - But put H, A to 4.6TeV fior simplicity.
- Simulate at LO and with no shower, UE etc
- Using Comix in Sherpa
- Three samples of t$\bar{\text{t}}$b$\bar{\text{b}}$:
  - hMSSM parameters, full model
  - H+ → tb from above decay forced
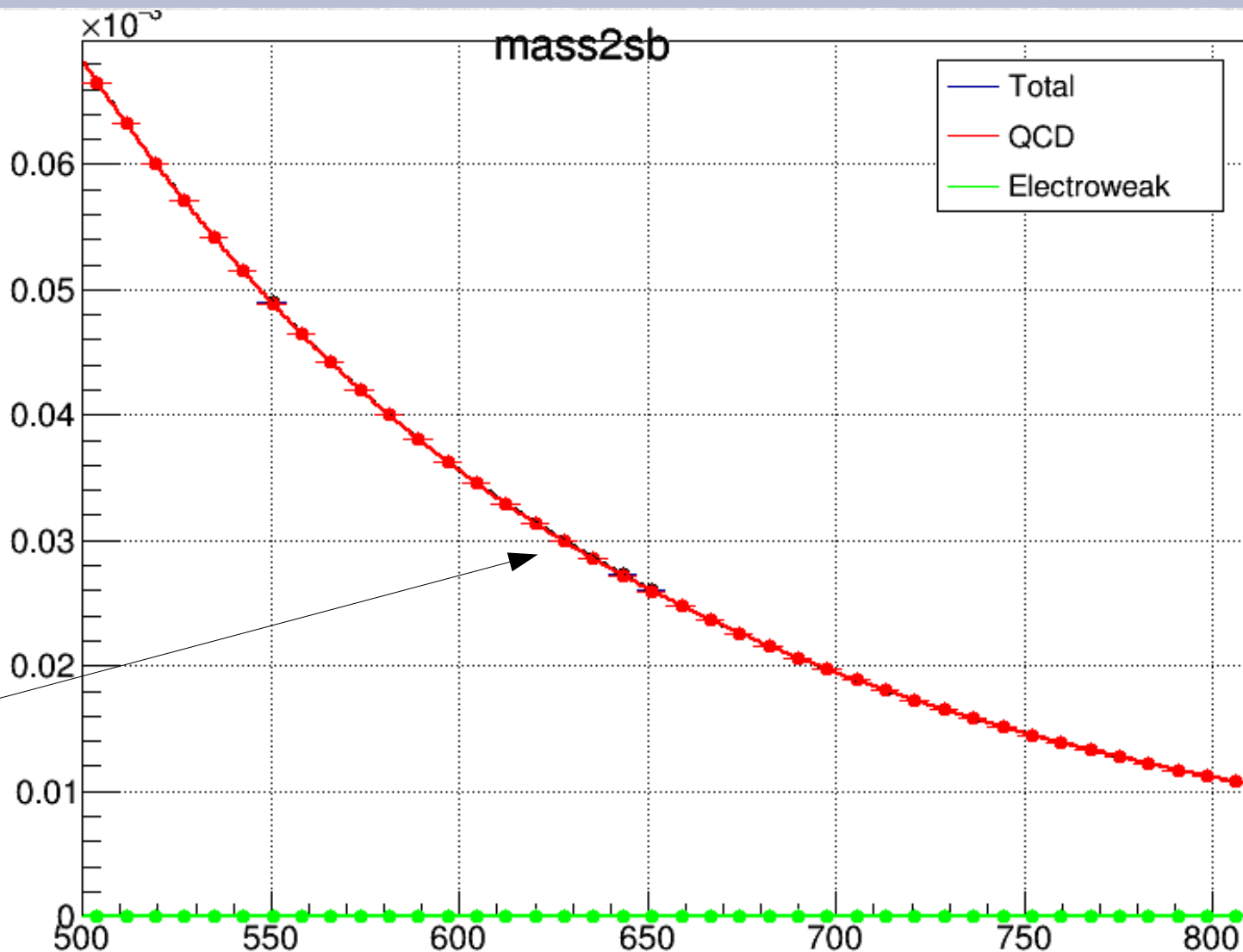 - hMSSM, but H+ mass set to 3000

- Amplitude: BW plus flat:
- Add quadratic background d

$$\mathcal{A} = \frac{\sqrt{\kappa(E/m)^3}}{(E^2 - m^2) + im\Gamma} + b + ci$$

$$\sigma = \frac{\sqrt{\kappa(E/m)^3}}{(E^2 - m^2)^2 + m^2\Gamma^2}\left(b(E^2 - m^2) + \sqrt{\kappa(E/m)^3} + cm\Gamma\right)$$
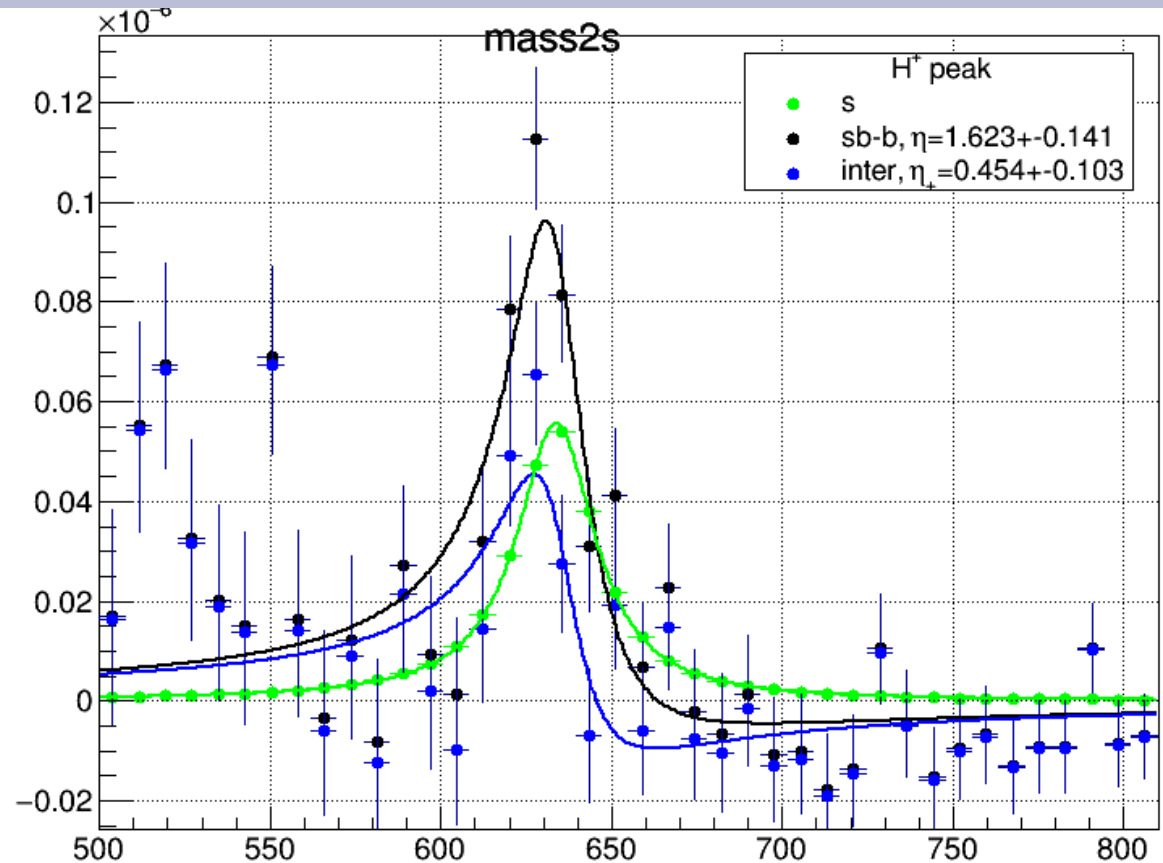$$+ \quad b^2 + c^2 + d(E)$$

tbtb mass

- 400M sb
- 480M b
- 8th order polynomial to describe background
- Signal
- Fit all 3 at once
- Chi2 poor for s, OK for sb, b

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tbtb mass

- 62% increase in peak
- And shift ~3GeV down
- Fit assumed FLAT background
  - Actually large at low mass

$$\sigma = \frac{\sqrt{\kappa (E/m)^3}}{(E^2 - m^2)^2 + m^2 \Gamma^2} \left(b(E^2 - m^2) + \sqrt{\kappa (E/m)^3} + cm\Gamma \right)$$
$$+ \quad b^2 + c^2 + d(E)$$