Unbinned fit
in Zy boosted analysis

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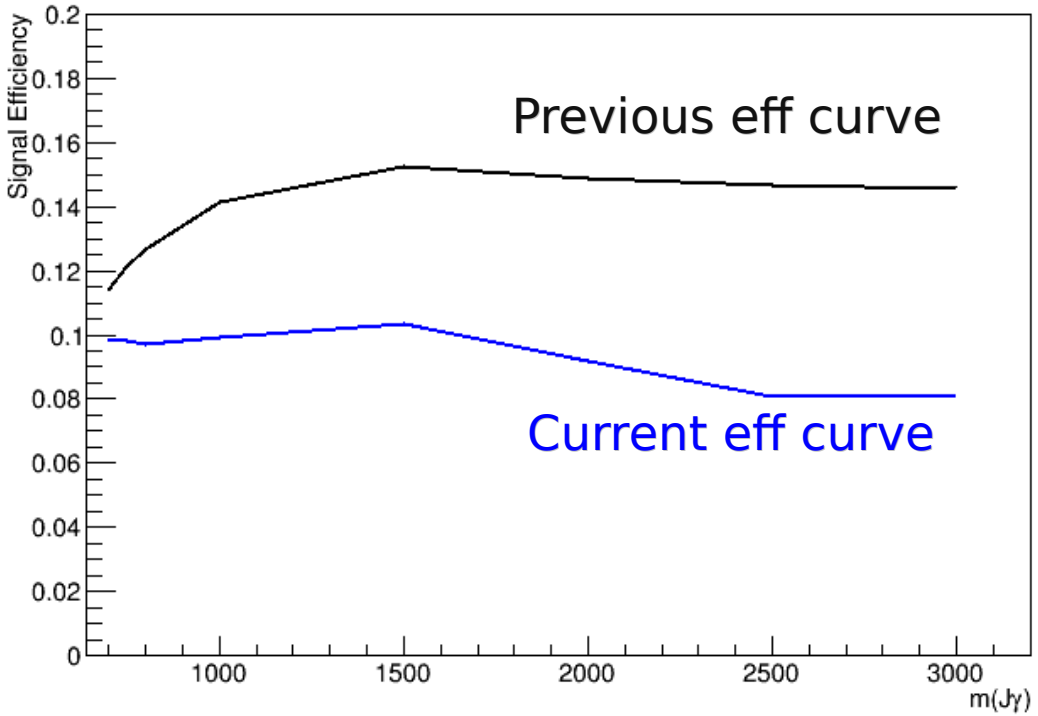
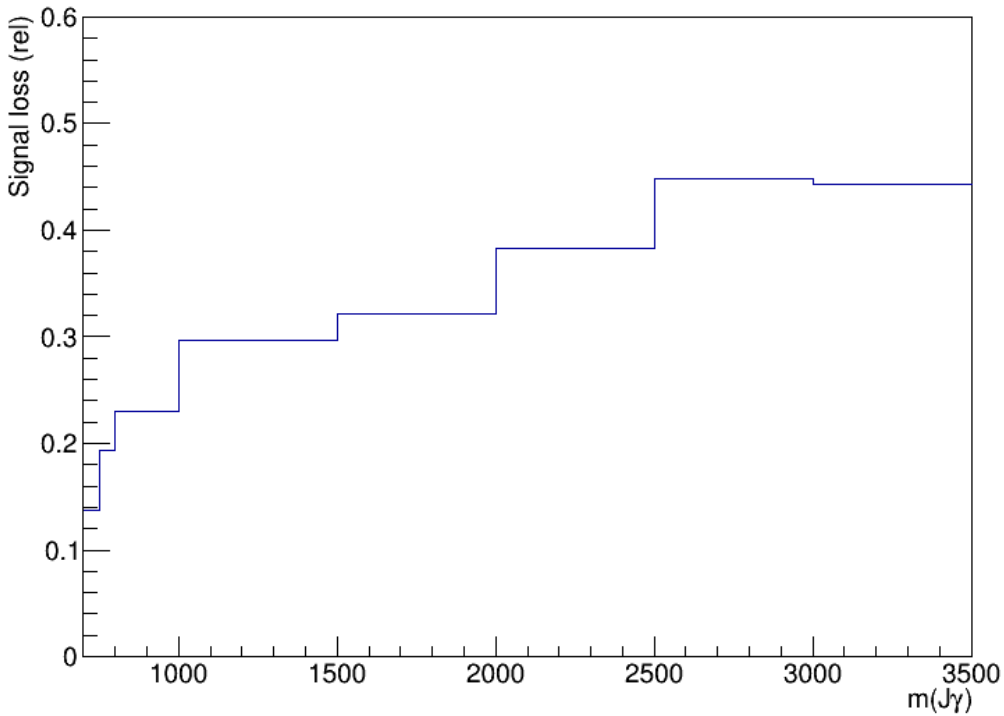
New rel pT cut

- Background has a reduction of ~40%
- Signal has small loss in low mass; but large loss in high mass

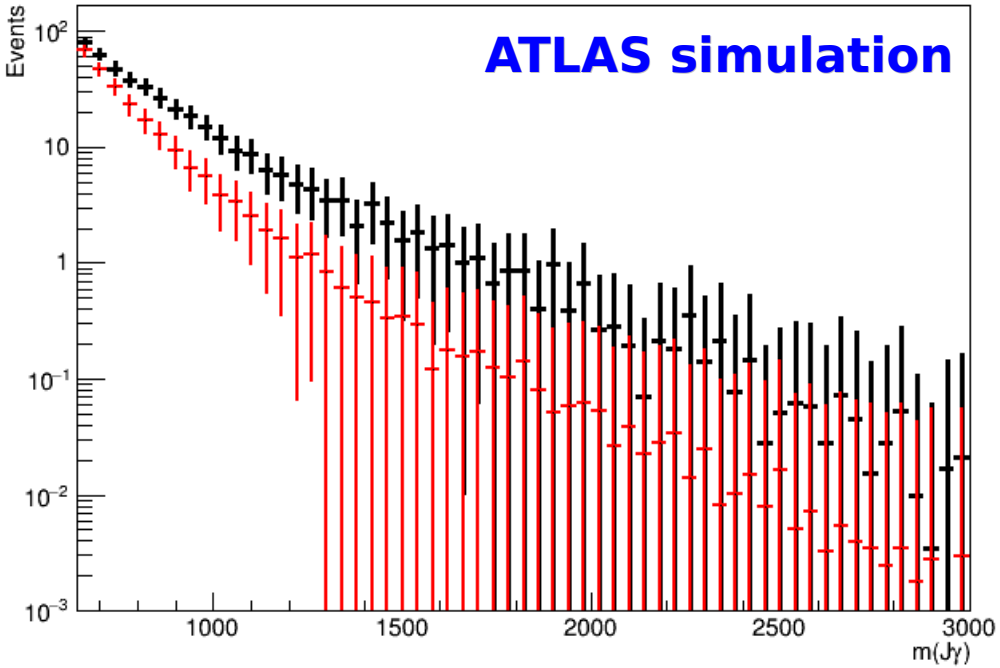
Before After Rel pT cut	before	after
MC (Sherpa y+jet)	425.659	243.565

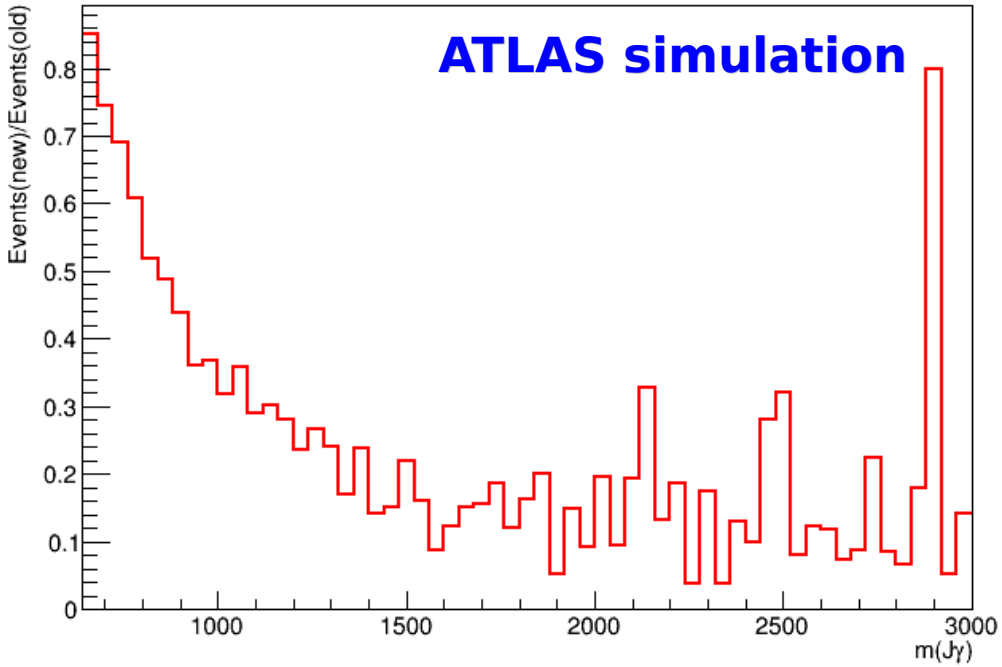




BKG (MC)

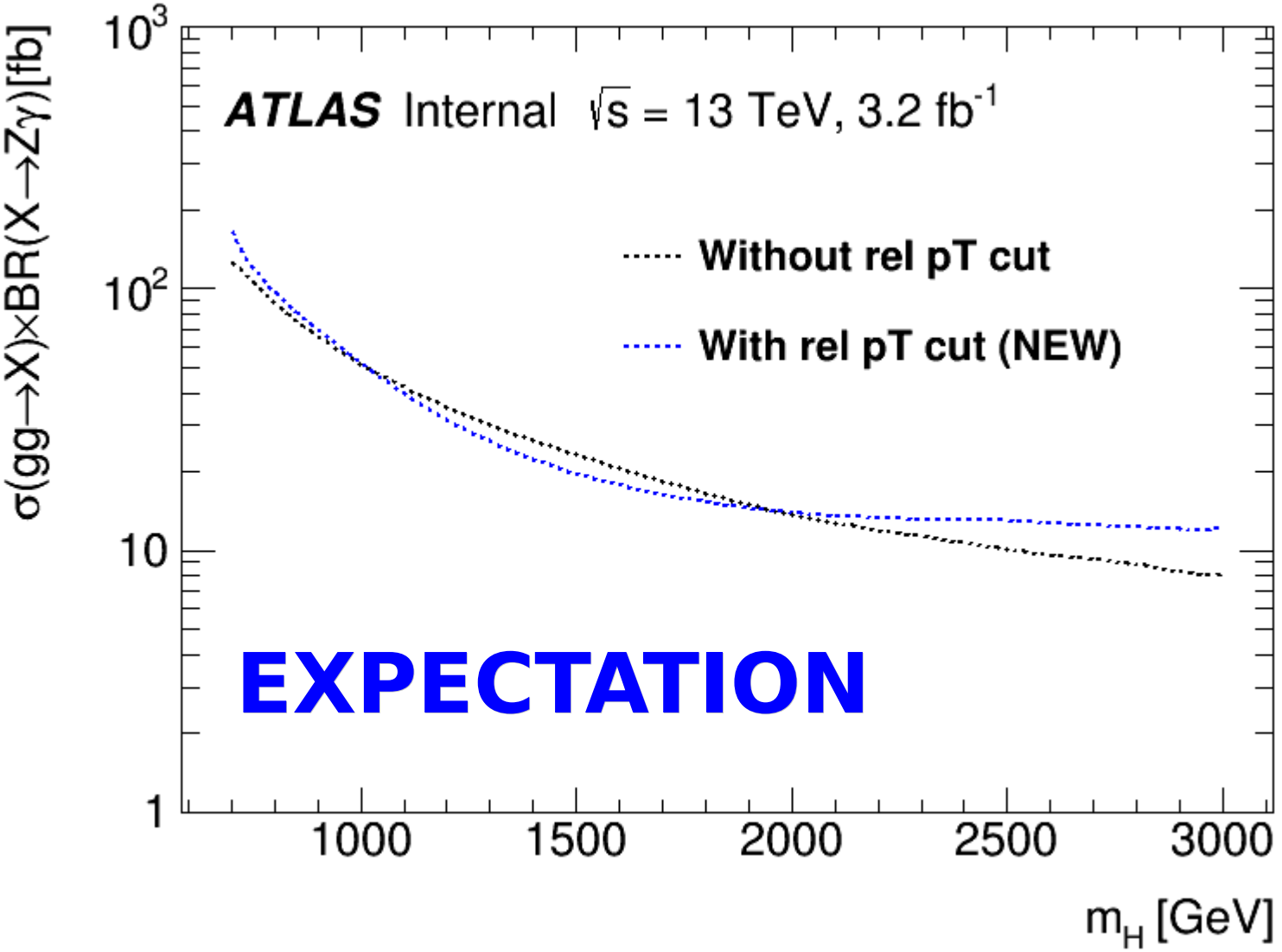
- Compare background shapce m(Jy) with MC before/after relative pT cut
- Large reduction appears since intermediate mass region





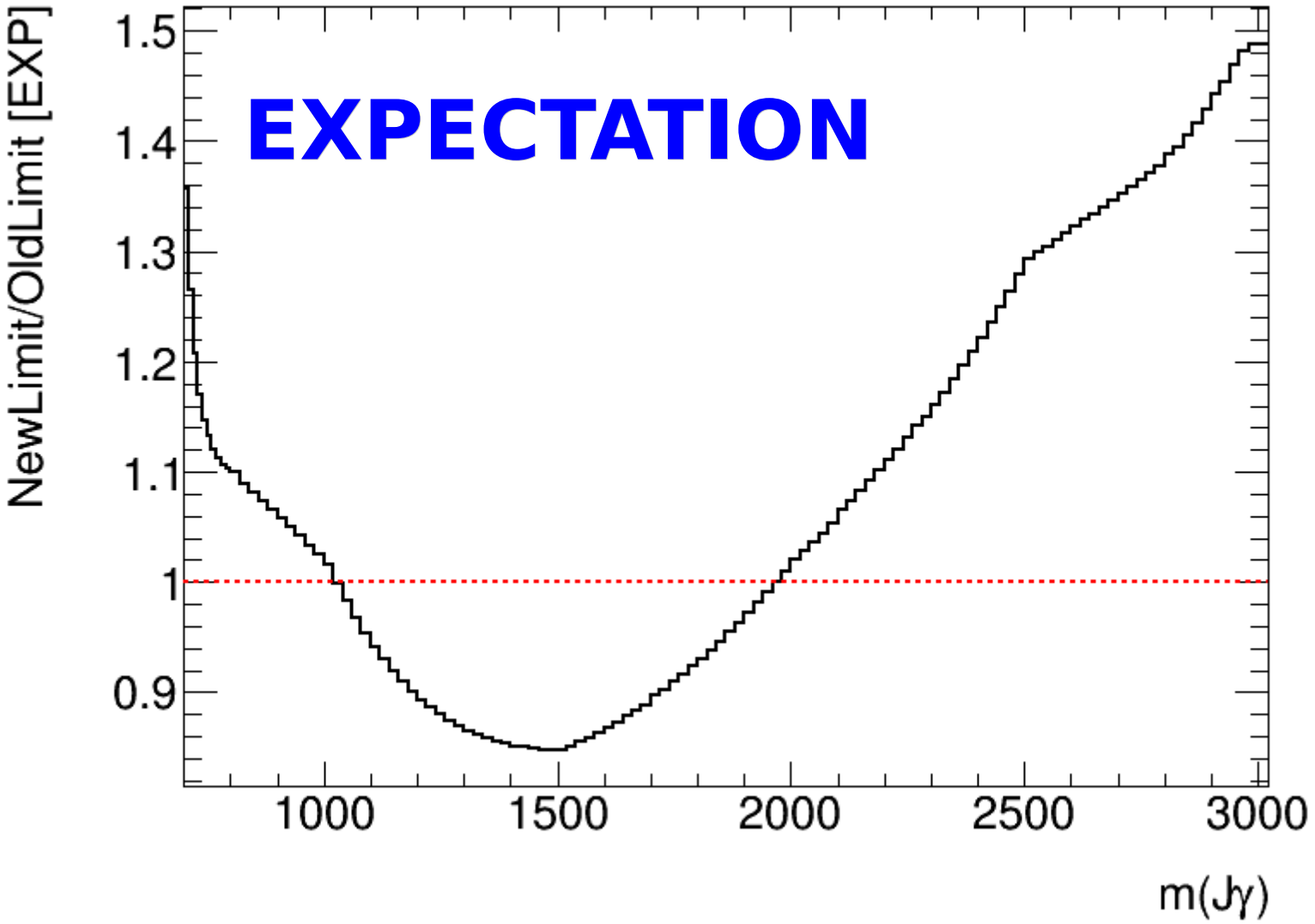
Expectation limit changes

- Limit changes before/after relative pT cut



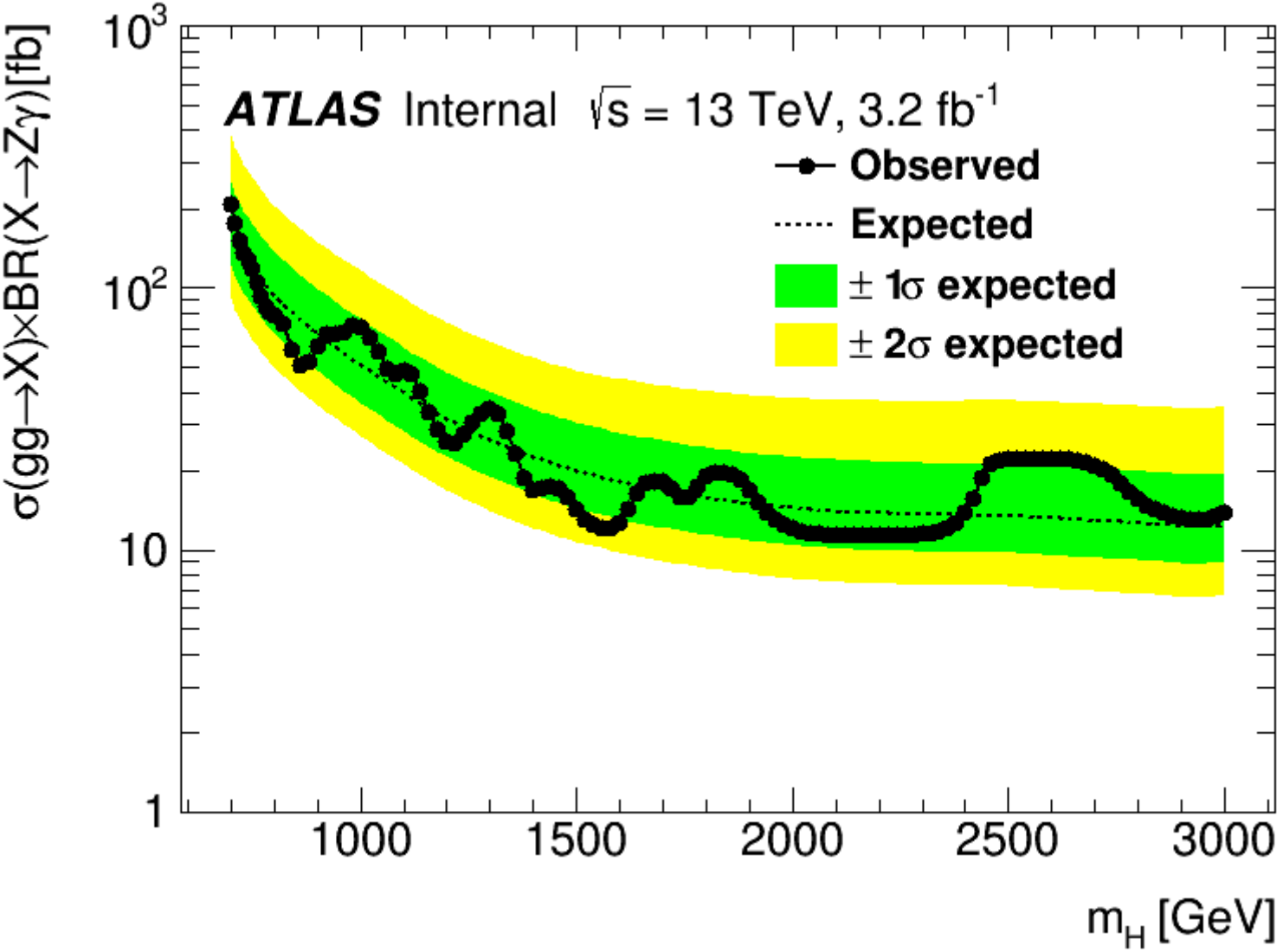
Expectation limit changes (ratio)

- Limit changes before/after relative pT cut



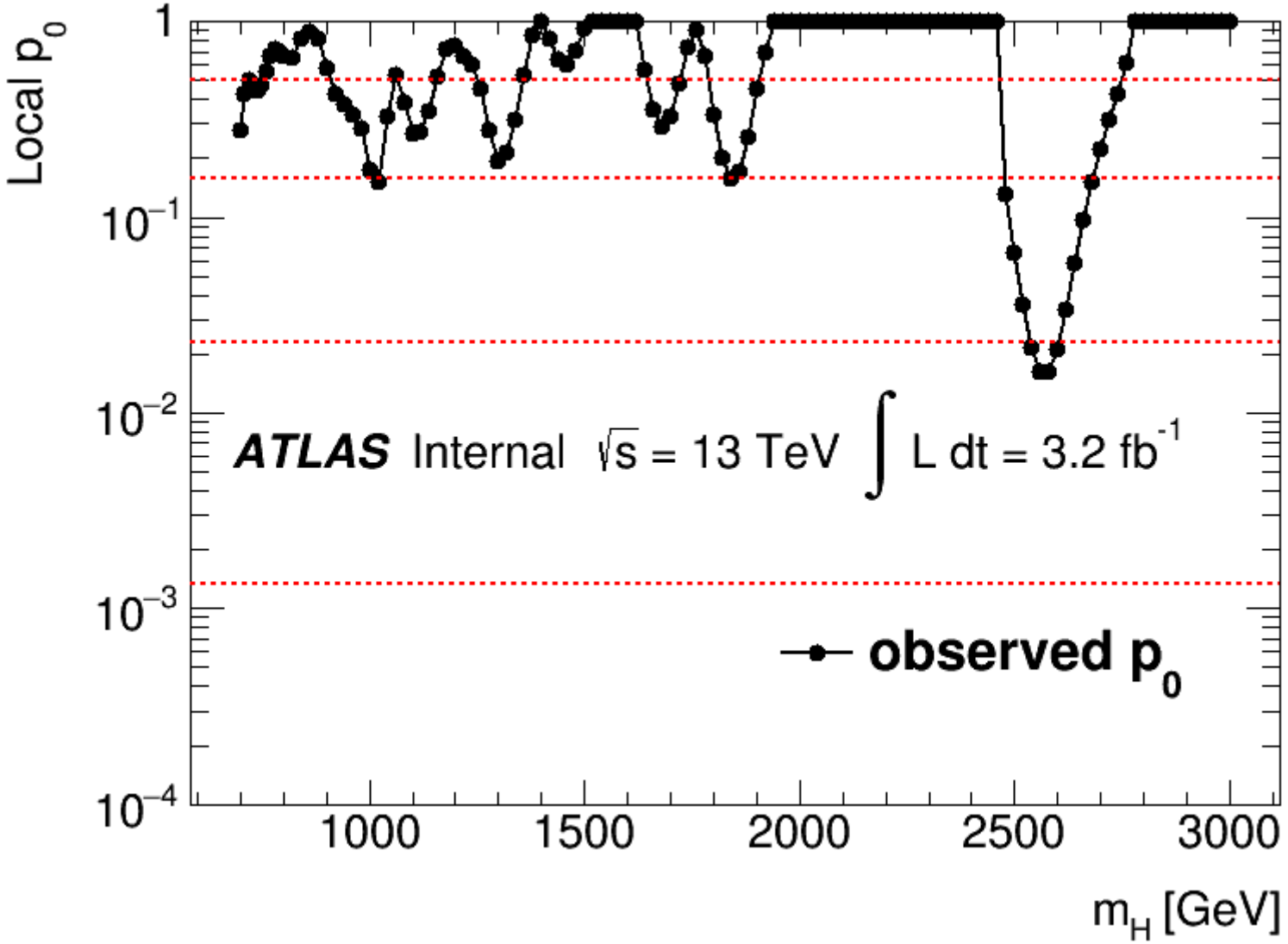
OBS

- Observation



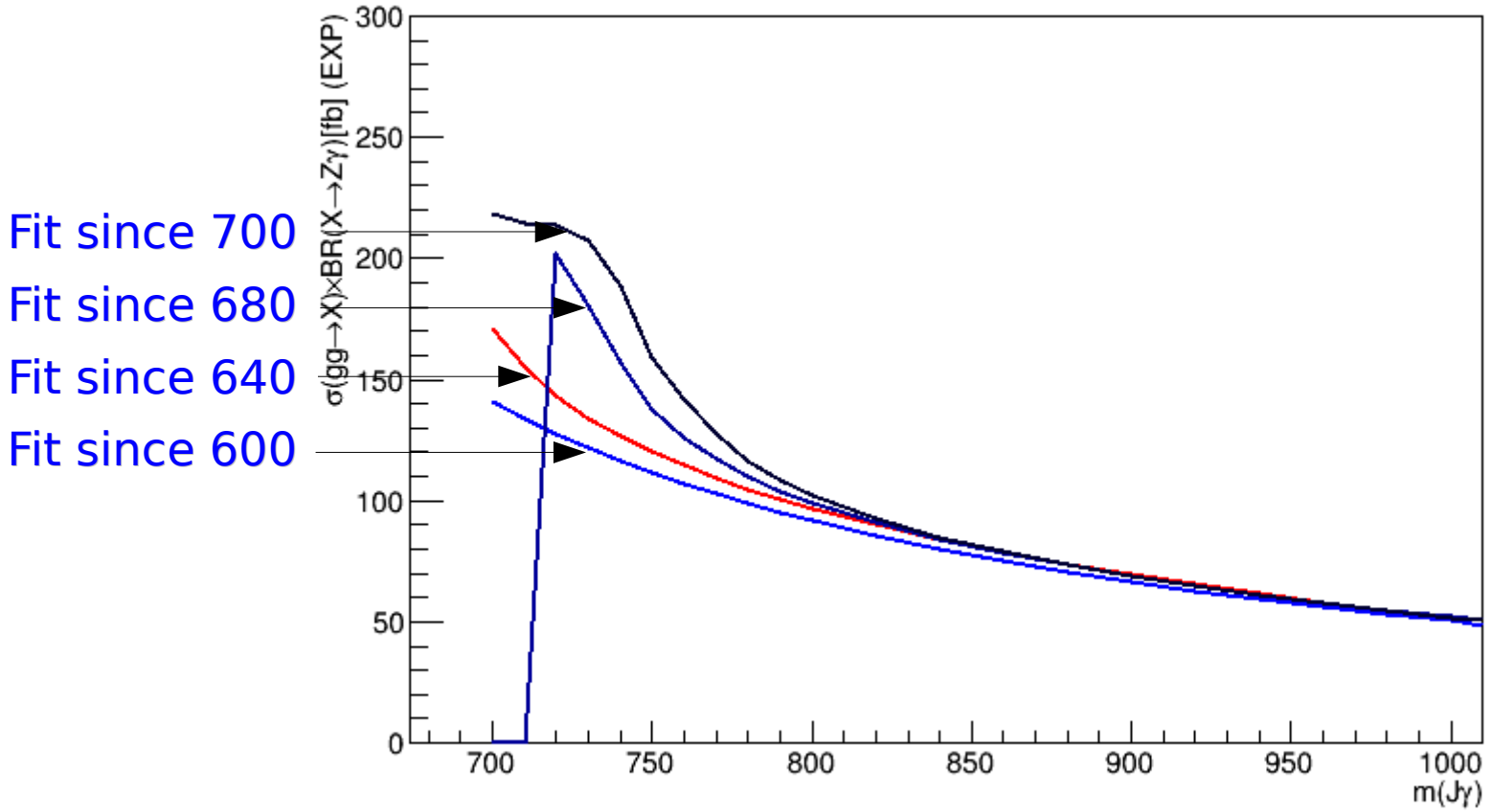
p0

- P0 against mass



Edge effects

- Use different fitting range (starting point), check the variation on expected limits
- Take into account the signal eff loss due to the fit range

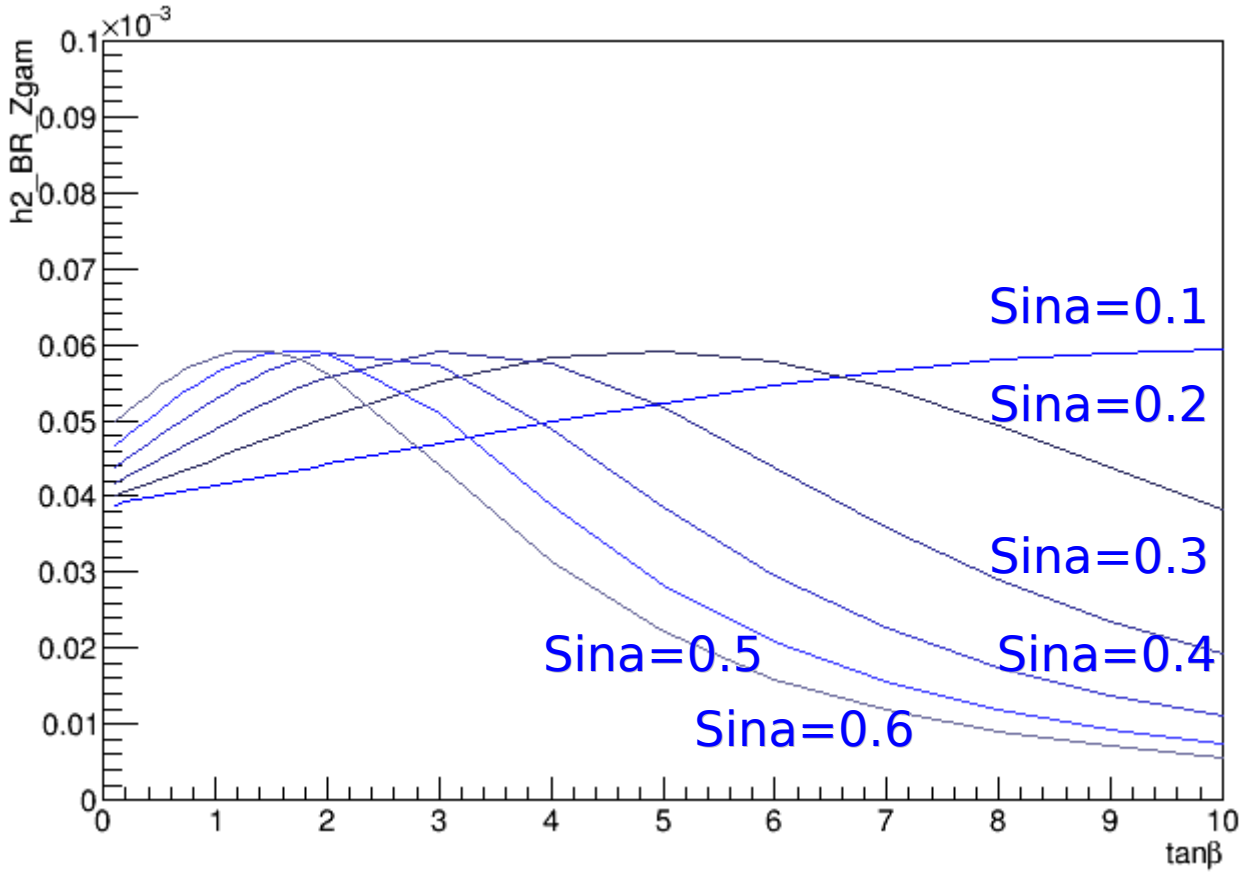


Additional singlet

- Additional singlet
- One lighter Higgs h, the other is heavier H
- I calculated xs (scaling from SM values, regardless EW corrections); Nikos provided BRs with sHDECAY
- I developed codes for a friendly interface
  - To be release this week
  - https://twiki.cern.ch/twiki/bin/view/AtlasProtected/HiggsBSMSingletrecommendations
- For now, no interpolation is implemented; so user has to query phase points only defined in our grid
  - Help() function states everything
  - Get xs: s.xs("PROCESS_NAME", mh2, sinalpha);
  - Get br: s.br("PROPERTIES", mh2, tanbeta, sinalpha);

Singlet

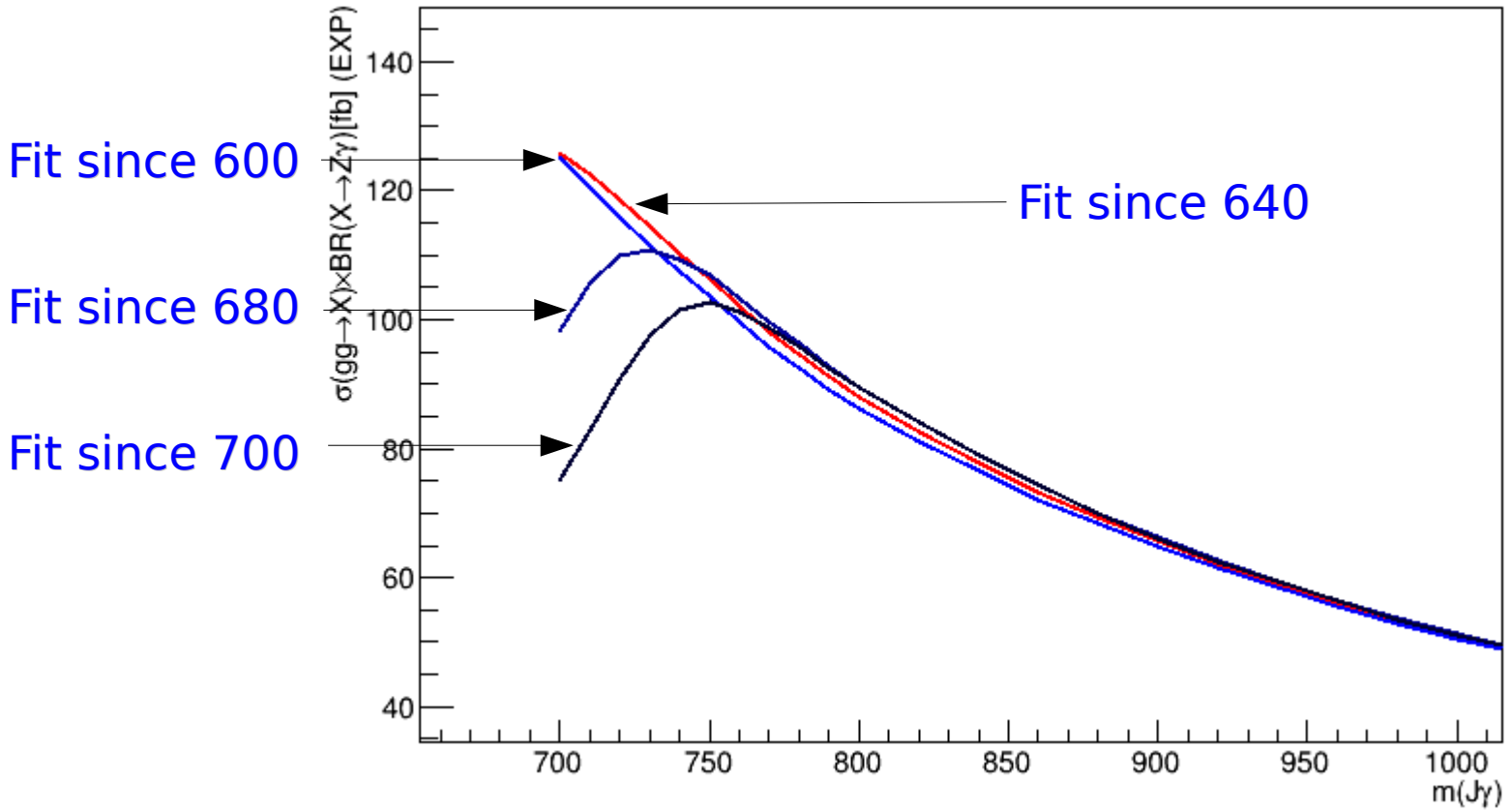
- An example of BR (h2_BR_Zgam) vs tanBeta given a certain sinAlpha



Backup

Edge effects

- Use different fitting range (starting point), check the variation on expected limits
- NOT take into account the signal eff loss due to the fit range



Before relative pT cut applied