

# discussion

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# Samples

- Sherpa\_gamgam\_2DP20\_160-250.MxAOD.p2419.h010.root
- Sherpa\_gamgam\_2DP20\_250-400.MxAOD.p2419.h010.root
- Sherpa\_gamgam\_2DP20\_400-650.MxAOD.p2419.h010.root
- Sherpa\_gamgam\_2DP20\_650-1000.MxAOD.p2419.h010.root
- Sherpa\_gamgam\_2DP20\_1000-1500.MxAOD.p2419.h010.root
- Sherpa\_gamgam\_2DP20\_1500-2000.MxAOD.p2419.h010.root
  
- Sherpa\_gamjet\_140-280\_\*.MxAOD.p2419.h010.root
- Sherpa\_gamjet\_280-500\_\*.MxAOD.p2419.h010.root
- Sherpa\_gamjet\_500-1000\_\*.MxAOD.p2419.h010.root
- Sherpa\_gamjet\_1000-2000\_\*.MxAOD.p2419.h010.root

# 2x2D sideband method

**red:** leading  $p_T$  photon candidate

**blue:** sub-leading  $p_T$  photon candidate

**A:** Tight and Isolated (TI)

**B:** Tight and not Isolated (TN)

**C:** not Tight and Isolated (nTI)

**D:** not Tight and not Isolated (nTN)

- **truncate information into the 7 shaded regions by assuming:**
  - ▶ fake rates in  $\gamma$ -jet and jet-jet events are equal
  - ▶ neglect possible jet-jet or photon-photon correlations

region	enriched with
<b>DD</b>	jet-jet
<b>DA</b>	$\gamma$ -jet
<b>AD</b>	jet- $\gamma$
<b>AA</b>	$\gamma\gamma$

subleading $\gamma$ not isolated	$\gamma$ +jet <b>AD</b> TL'	<b>CD</b> L'L'	<b>BD</b> TL'	jet+jet <b>DD</b> L'L'
	<b>AB</b> TT	<b>CB</b> L'T	<b>BB</b> TT	<b>DB</b> L'T
subleading $\gamma$ isolated	<b>AC</b> TL'	<b>CC</b> L'L'	<b>BC</b> TL'	<b>DC</b> L'L'
	$\gamma\gamma$ <b>AA</b> TT	<b>CA</b> L'T	<b>BA</b> TT	jet+ $\gamma$ <b>DA</b> L'T
	leading $\gamma$ isolated		leading $\gamma$ not isolated	

# Bkg decomposition results - exotic selection

- Purities from inclusive study:

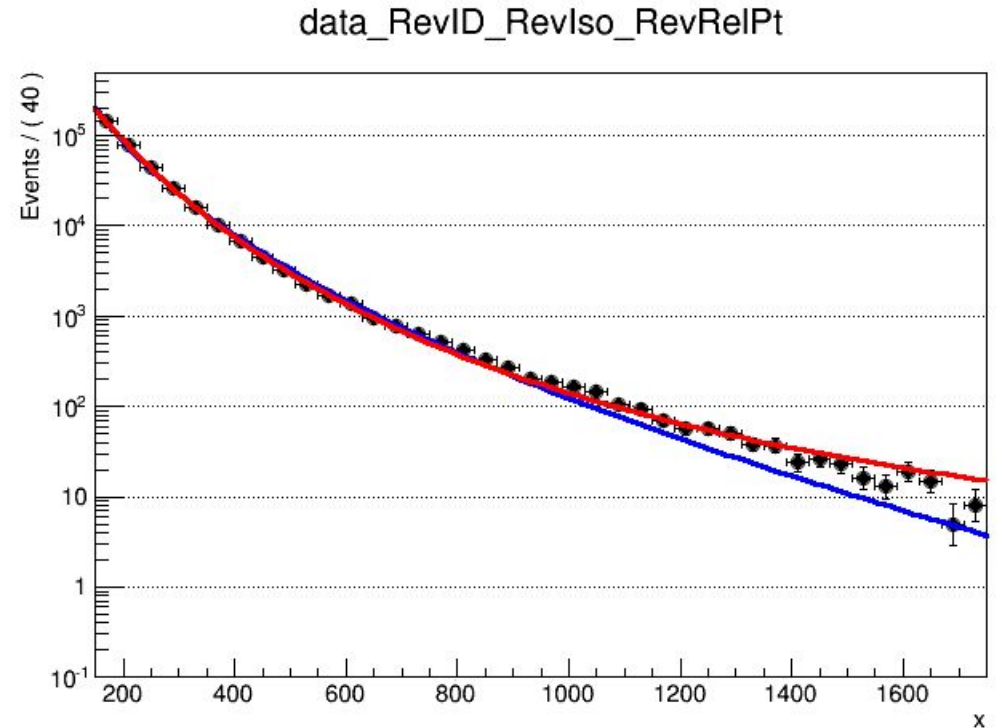
component	2x2DSB	matrix method
diphoton	$0.690 \pm 0.010^{+0.021}_{-0.049}$	$0.709 \pm 0.014^{+0.015}_{-0.032}$
photon-jet	$0.273 \pm 0.008^{+0.036}_{-0.016}$	$0.254 \pm 0.010^{+0.021}_{-0.015}$
dijet	$0.038 \pm 0.002^{+0.012}_{-0.001}$	$0.038 \pm 0.002^{+0.015}_{-0.002}$

## Bkg decomposition results - other selections (I)

- From matrix method:

selection	purity (inclusive)	purity (700-850 GeV)
exotic	$0.709 \pm 0.014^{+0.015}_{-0.032}$	$0.86 \pm 0.12$
Higgs	$0.920 \pm 0.013^{+0.017}_{-0.026}$	$1.00 \pm 0.20$
exotic with Higgs iso	$0.934 \pm 0.017^{+0.012}_{-0.021}$	$0.95 \pm 0.14$
Higgs with exotic iso	$0.693 \pm 0.013^{+0.021}_{-0.032}$	$0.91 \pm 0.18$
exotic - Higgs	$0.583 \pm 0.019^{+0.020}_{-0.039}$	$0.81 \pm 0.12$

spurious signal?



$$f_0(x) = (1 - x^d)^b x^{a_0}$$

(blue)

$$f_1(x) = (1 - x^d)^b x^{a_0 + a_1 \log(x)}$$

(red)

$$f_2(x) = (1 - x^d)^b x^{a_0 + a_1 \log(x) + a_2 \log(x)^2}$$

(green)

gam(TI)jet(nTN)

