Some feedback from discussions with Jorgen (1)

- Quoting significances $s/\sqrt{(s+b)}$ or limits without taking into account the main **systematic uncertainties** will probably not be sufficient, even for a pheno paper.

  – e.g. if ttbar is main bkg, ttbar cross section uncertainty of 5-10% may wash out a signal of “20 sigma” completely

  – need to identify and at least quote some estimation of the main systematics per final state (xsection, jet energy scale, ...)

  – maybe quoting **$s/\sqrt{(\text{sum of variances})}$** = $s/\sqrt{(s+b+(X\%*b)^2)}$?
  → better, but also not so fair since this assumes one would not have control on background modeling (while on data one can use data-driven methods to reduce systematics)

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Some feedback from discussions with Jorgen (2)

- Way to go in actual data analysis is usually some form of **template fit** to extract signal significance
  - e.g. fitting distribution of some kinematic variable(s) or possibly an MVA discriminator for background+signal
  - we could already *demonstrate* the power of such a fitting procedure in the pheno analyses
    - → some more work but would give valuable information!

- **Studying correlations of two kinematic variables** can be interesting to disentangle right and wrong jet/lepton combinations or separate signal and background (e.g. see Isis' analysis)
  - → such a 2D distribution might even be used in a template fit

Current final states explored (outdated?)

ttbar (FCNC interaction in decay)

Signature	Main coupling	MVA
1 lepton (+ 3 b jets)	H - q - t	Yes, but doesn't help
3 leptons	Z - q - t	yes
2 same-sign leptons	H - q - t	yes
2 photons + 1 lepton	H - q - t	not needed

single top (FCNC interaction in production)

Signature	Main coupling	MVA
1 lepton (+ 1 b jet)	g - q - t	yes
3 leptons	Z - q - t	yes
2 same-sign leptons	H - q - t	not yet?
1 photon + 1 lepton	γ - q - t	not yet / not feasible?

Issues and planning

- Still lack of some **MC background statistics** for some analyses?

- **Fake lepton** issues (“overestimation?”) still to be revisited carefully

- Need an updated planning for the **paper**
  - realistic time estimate of work left to finish analyses?
  - do we include more final states or continue with the ones we have now?
  - timeline and person power for writing paper (draft)?