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IIHE Status Report
20/11/2014

Monte-Carlo Production

- Remaining processes (IIHE):
  - TTH -> Done
  - TTAA (semi-lep, dilep)
  - AA

Class A

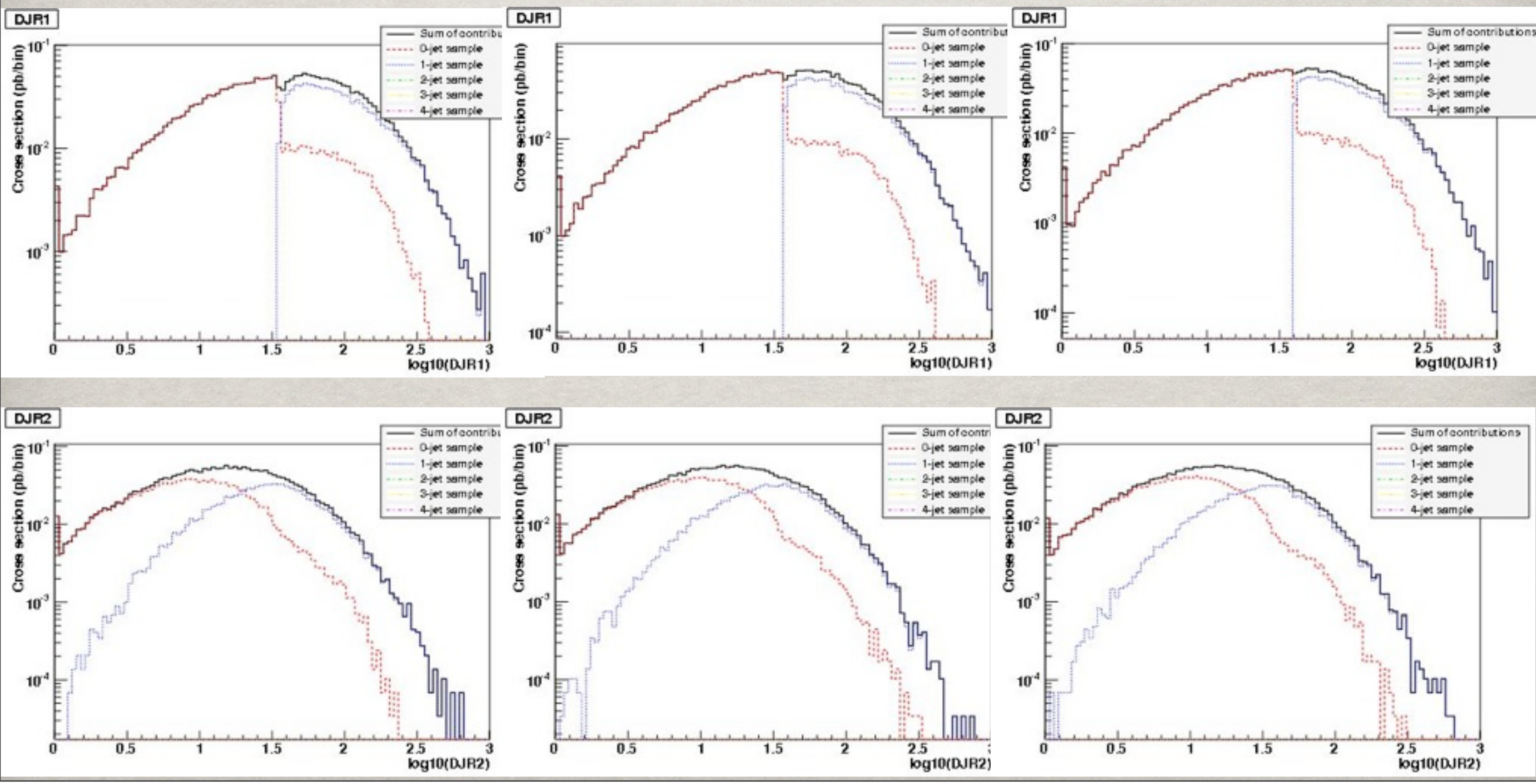
- After having discussed with Eric:
  - $m_{\gamma\gamma}$>50 GeV (backgd to Higgs, no need to generate events with lower masses)
  - Frixione isolation:
    - ptgamma = 15 GeV/c
    - R0gamma = 0.7

TTAA

- Matching study (almost finished):
  - Performed on TTA. TTAA should not be widely different. Will check if xqcut/cut values are appropriate for TTAA afterwards.
  - Up to 1 additional parton
  - Top decays via Madspin

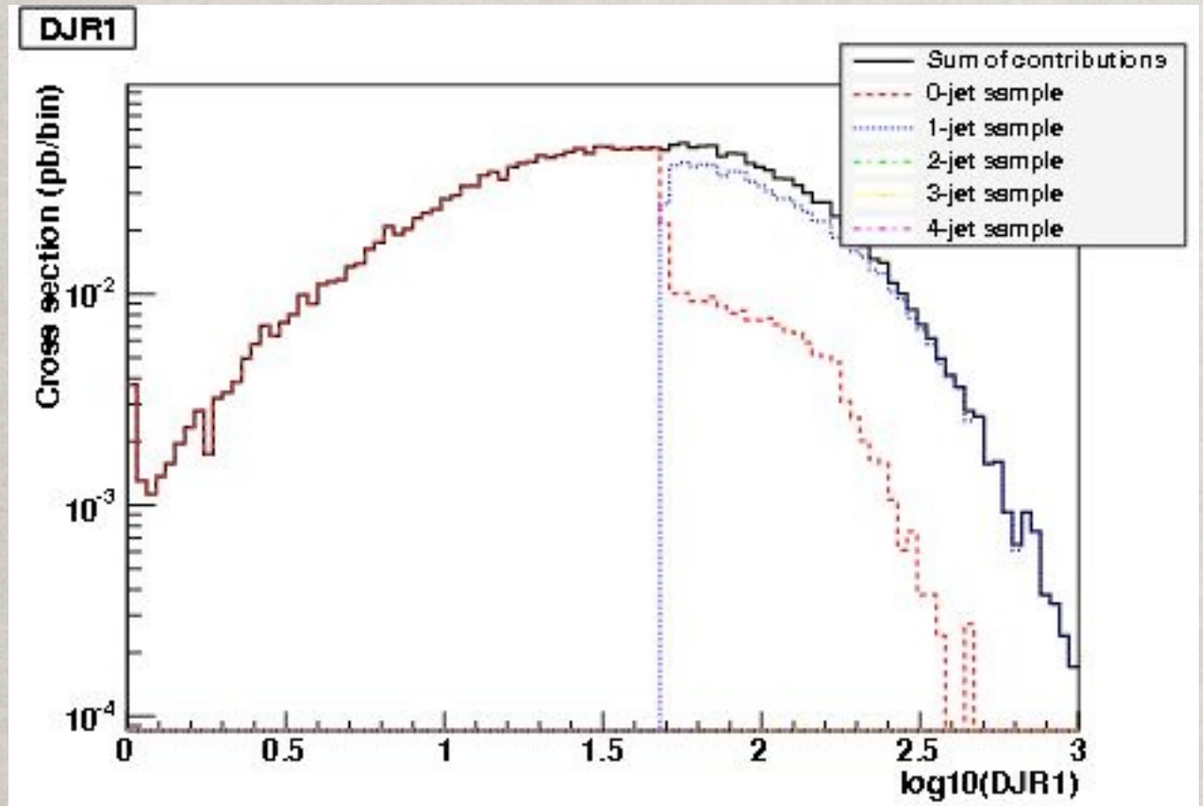
TTAA

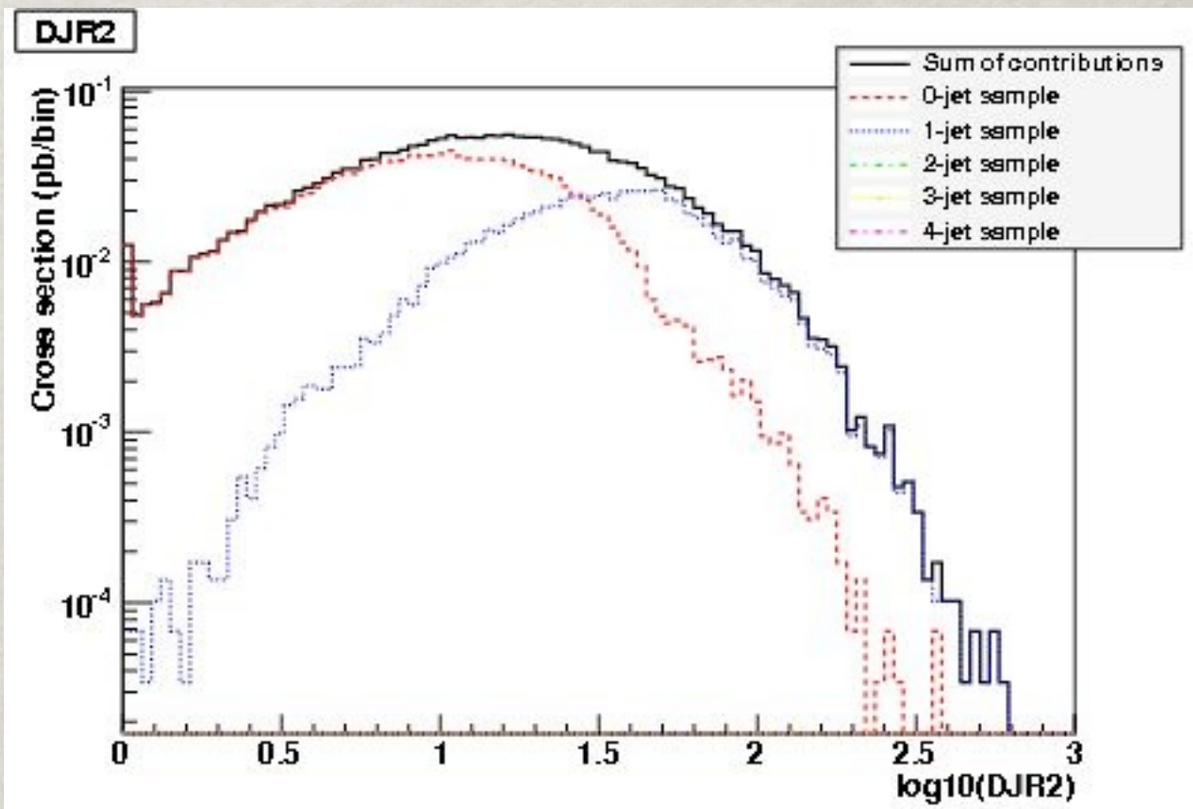
- Xqcut=35 (same as for TT), qcut = 35,37,40



TTAA

- And the winner is... auto!
  - Gridpacks are the way.





AA

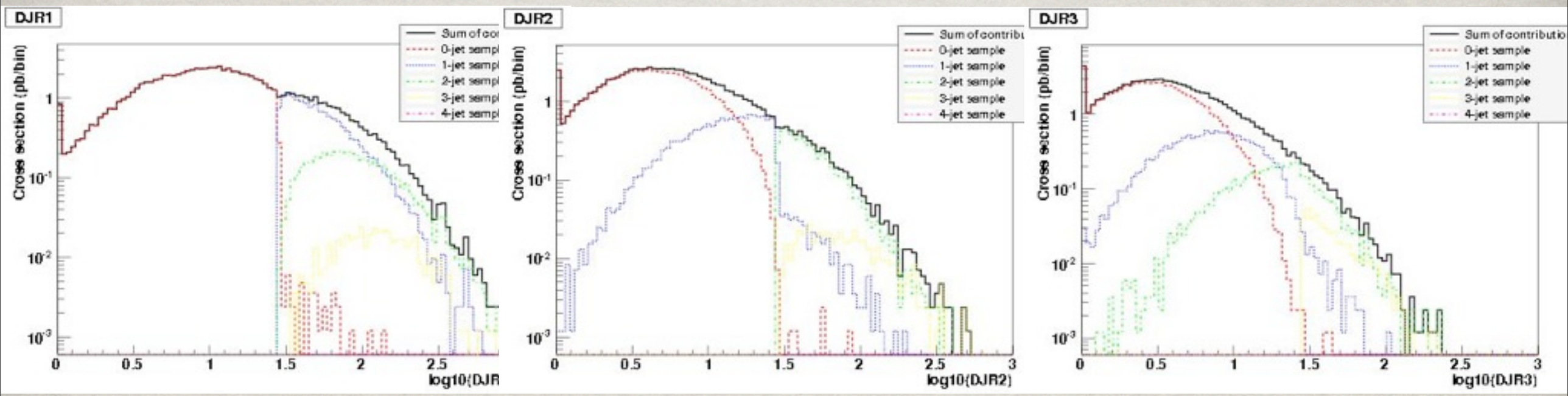
- Relevant background for Higgs searches
  - Side remark: what about the box-diagrams?
- XS section : $\sigma(\gamma\gamma)$ = 72.9 pb @ 13 TeV ($m_{\gamma\gamma}$>50 GeV)
- K-factor: needs to be calculated with MG5_aMC@NLO.
  - Pb: no cut on $m_{\gamma\gamma}$ by default. Needs to be implemented in MG code... in fortran.

AA

- Matching study:
  - Up to 3 jets. Tried up to four but too CPU intensive.
  - Xqcut = 25,30,35,40

AA

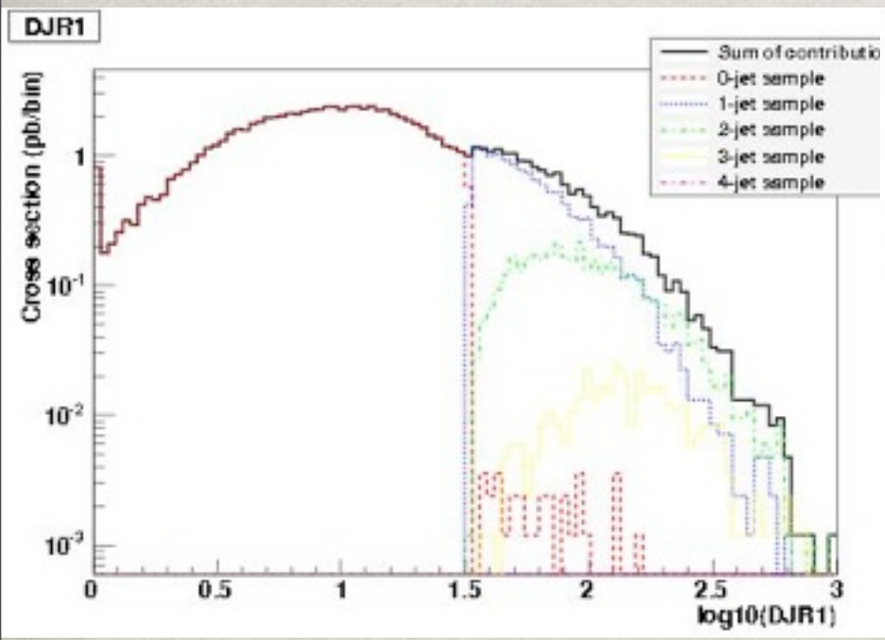
- Qcut scanned with 1 GeV step.

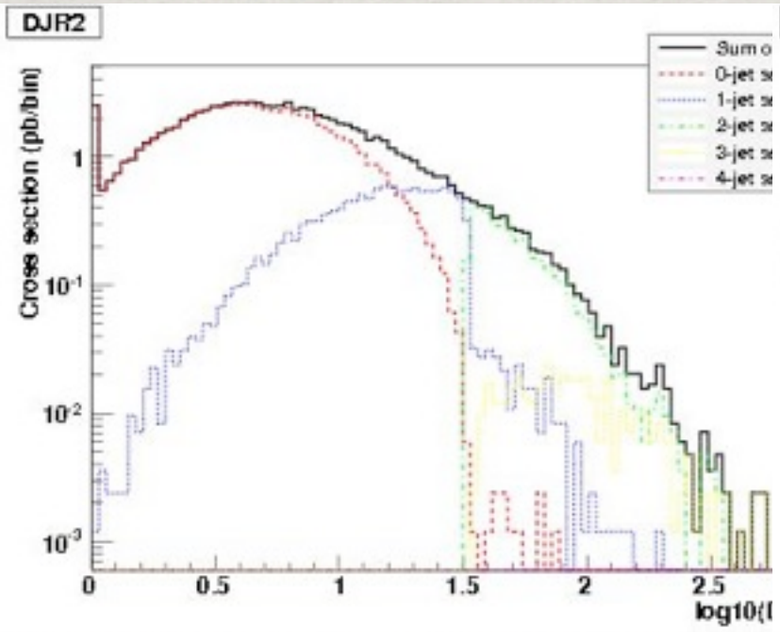


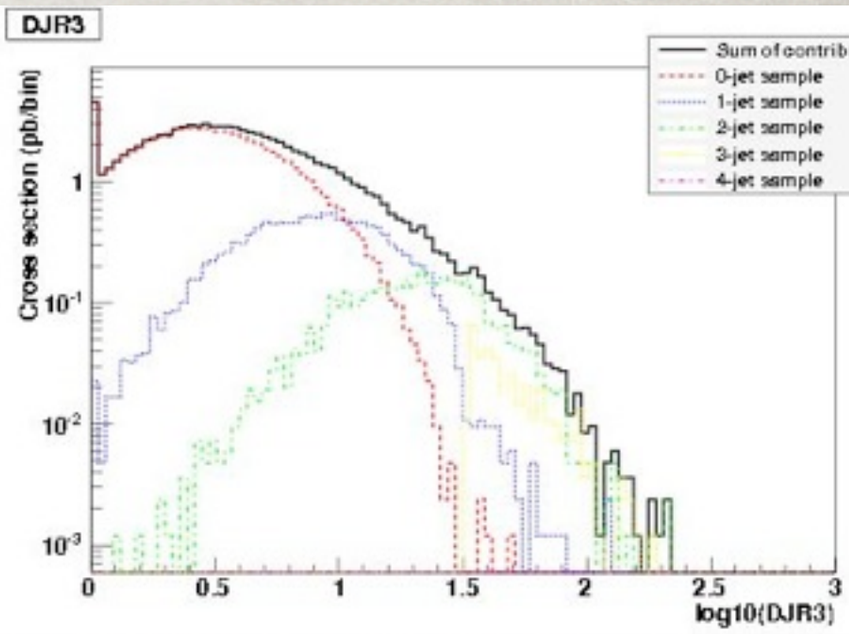
- Xqcut = 25, Qcut = 28 seems the best we can have

AA

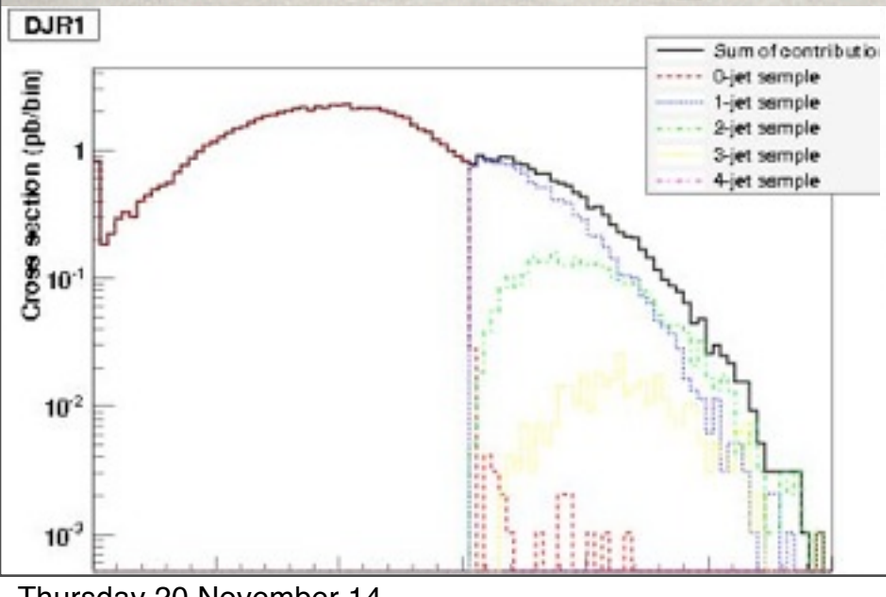
- But xqcut=25 and qcut=33 is not bad either...

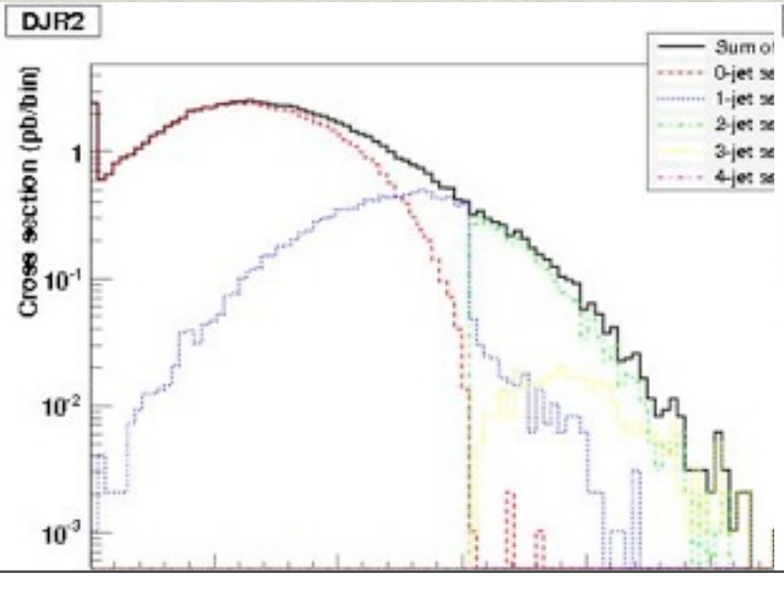


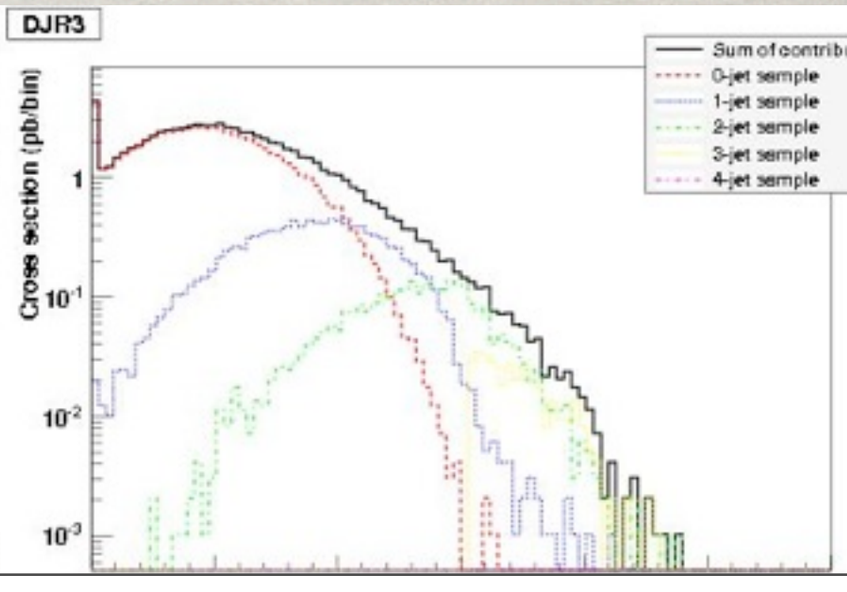




- And xqcut = 30, qcut = 34...







Ongoing Analyses

- 1L3B -> Fully implemented. All backgrounds included. Working on an MVA to reconstruct the Higgs.
- 2SSL -> Analysis just started. No plot yet.
- 3L -> Code in place but stalled because of missing backgrounds until recently (for ex: Z+4 jets).
- AA -> Fully implemented. Results already shown. Waiting for AA+jets backgrounds.

Discussions

- Paper content:
  - What do want to put in the paper?
    - Clarifying would help to design the analysis.
    - Ex: do we need MVA in tqH, H->AA? Or is good enough?
- Revisited timelines?