BDT Regression Variables

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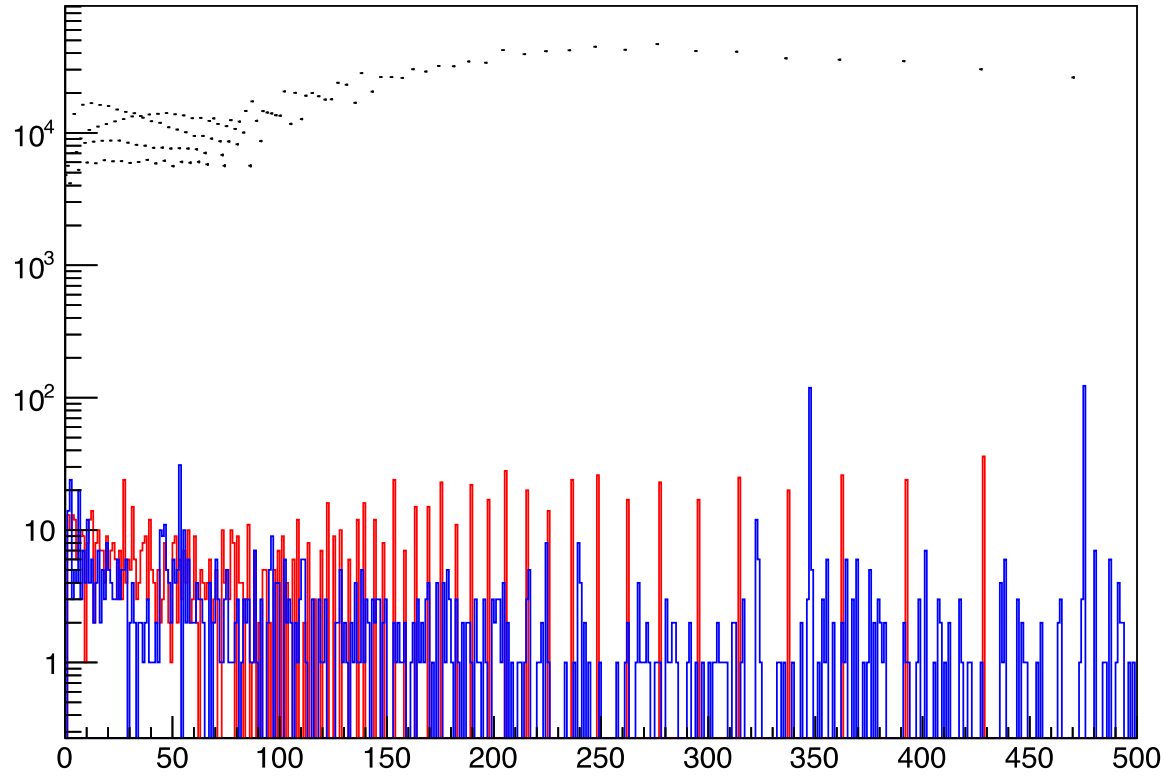
Variable Cut Value Distributions

- Black
  - Input variable distribution from 2017 BDT training sample
- Red
  - BitCompressed + RPC (2017 BDT: Mode_15_invPtTarg_invPtWgt)
- Blue
  - Non-BitCompressed, no RPC (MODE_15_logPtTarg_invPtWgt)

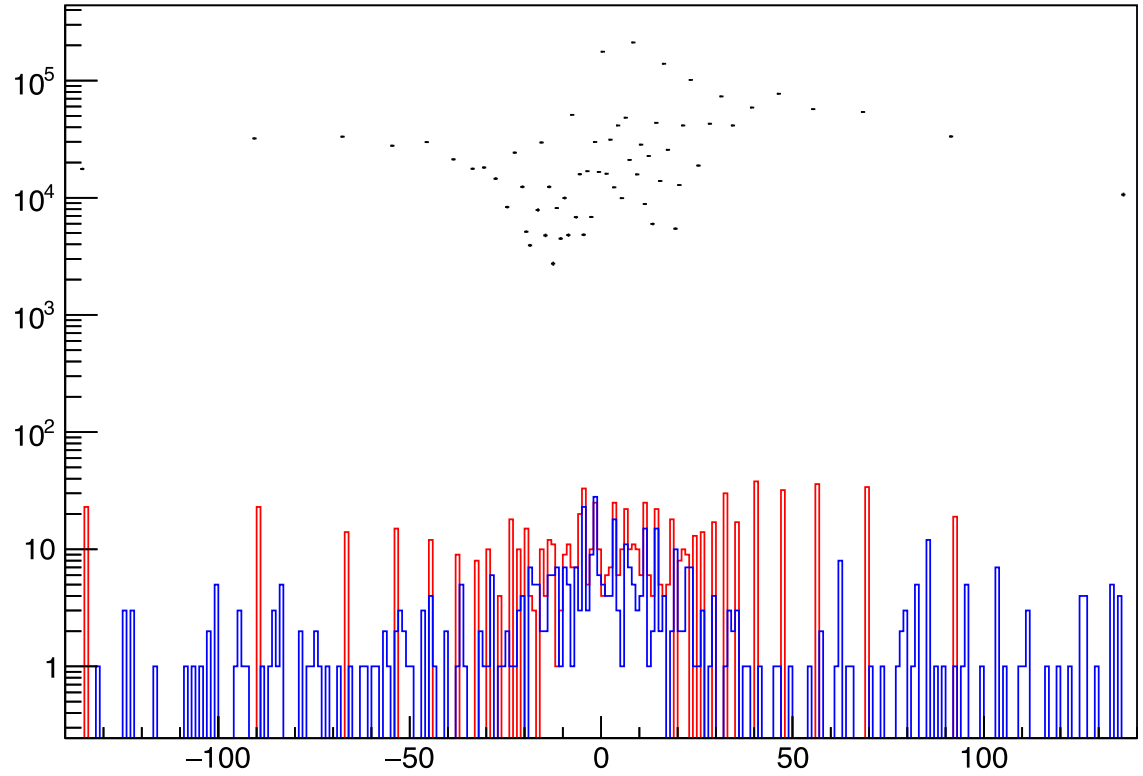
Bits allocation [1]

Four-Station Modes													
Mode	**Feature**	$\Delta\phi_{12}$	$\Delta\phi_{23}$	$\Delta\phi_{34}$	sign	$\Delta\theta_{14}$	B_1	B_2	B_3	B_4	FR_1	θ	Mode
1-2-3-4	**Bits**	7	5	4	2	2	2	1	1	1	1	3	1

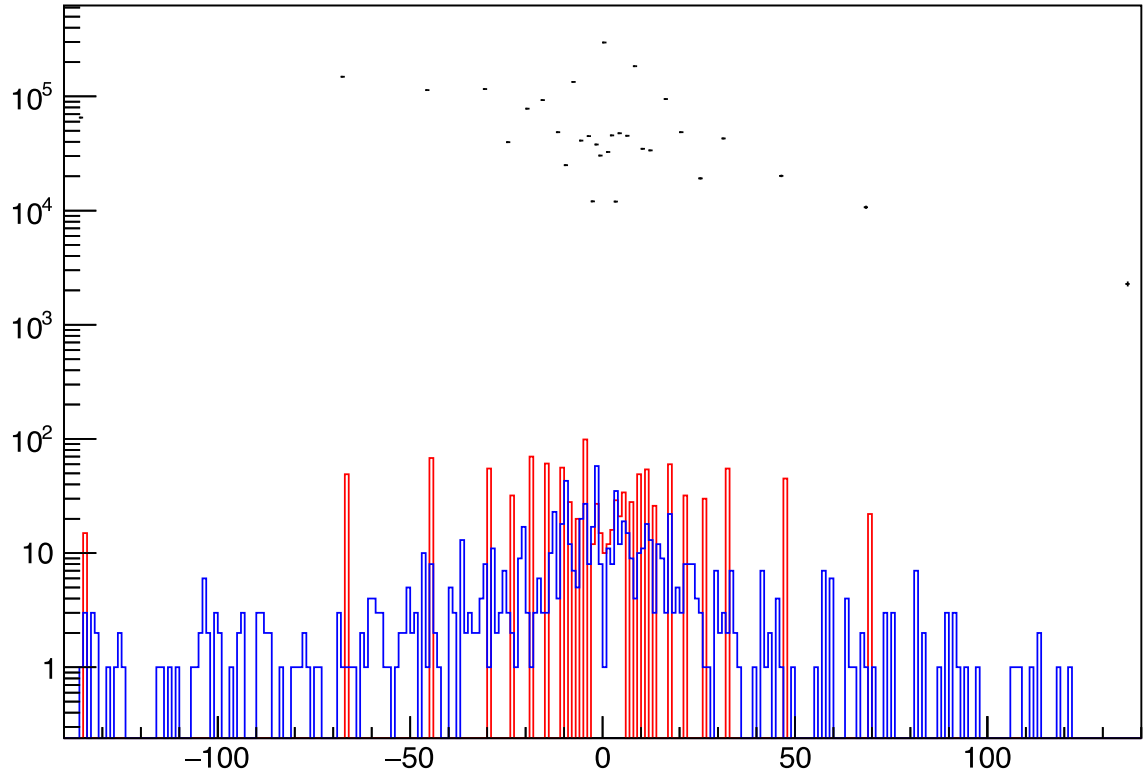
dPhi_12: 7 bits



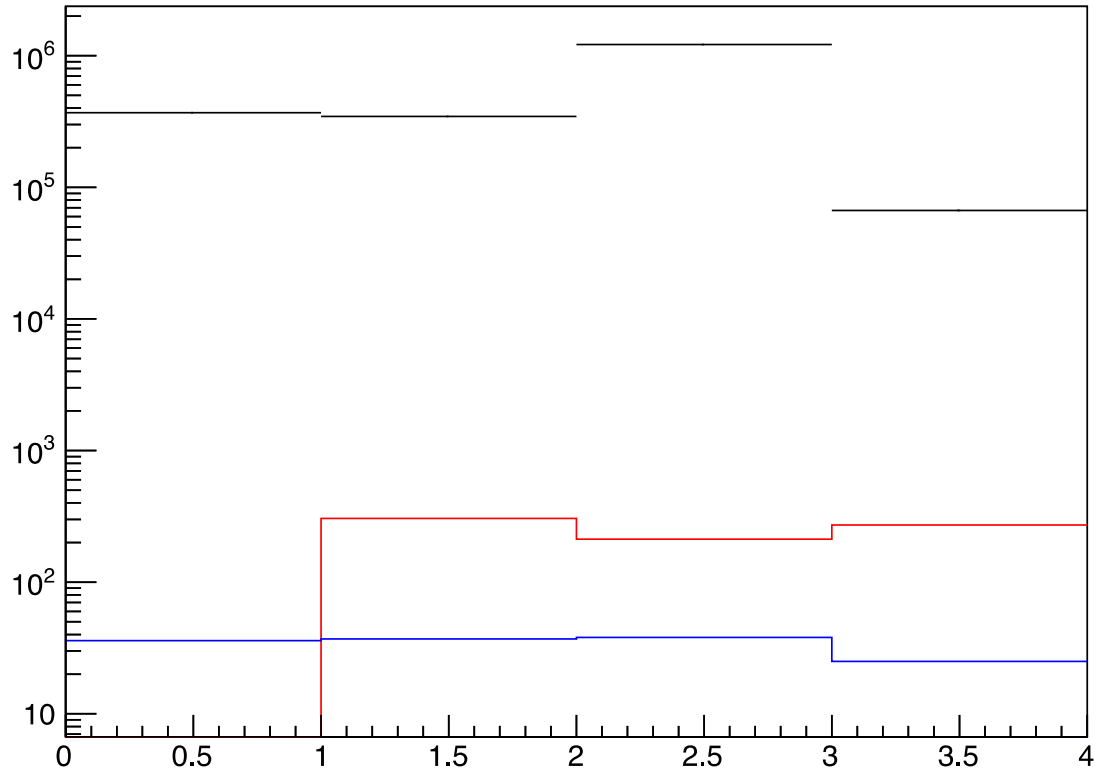
dPhi_23: 5 bits



dPhi_34: 4 bits

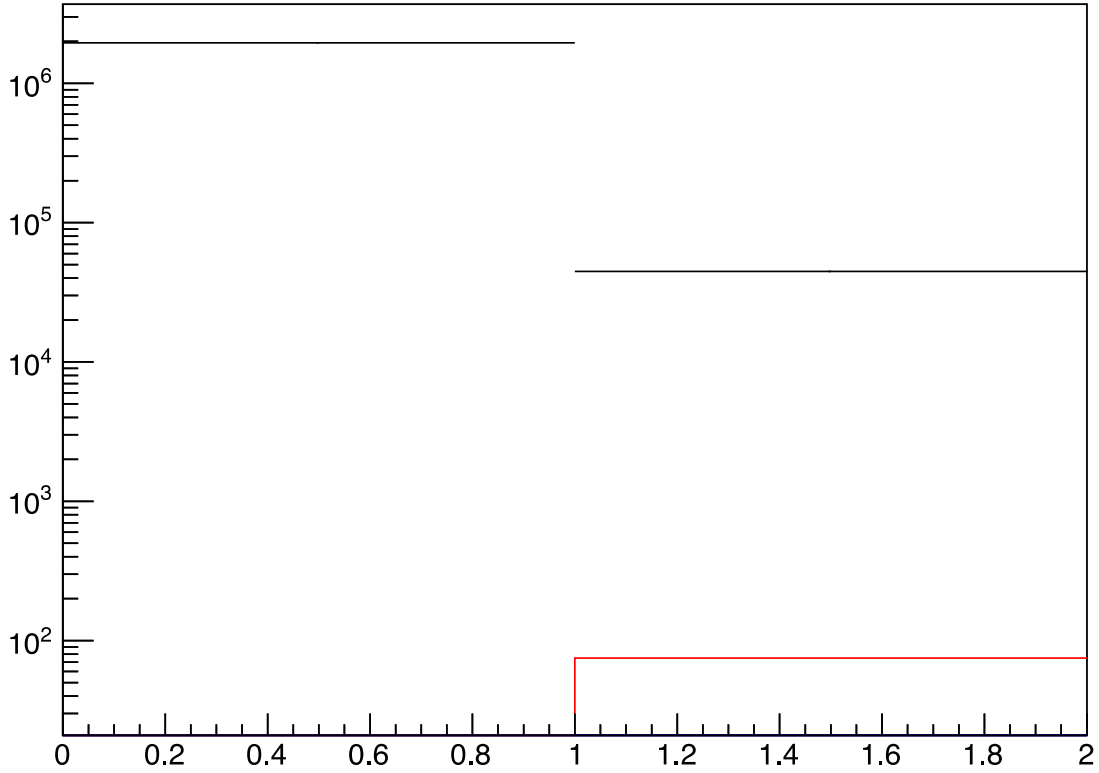


dTh_14: 2 bits

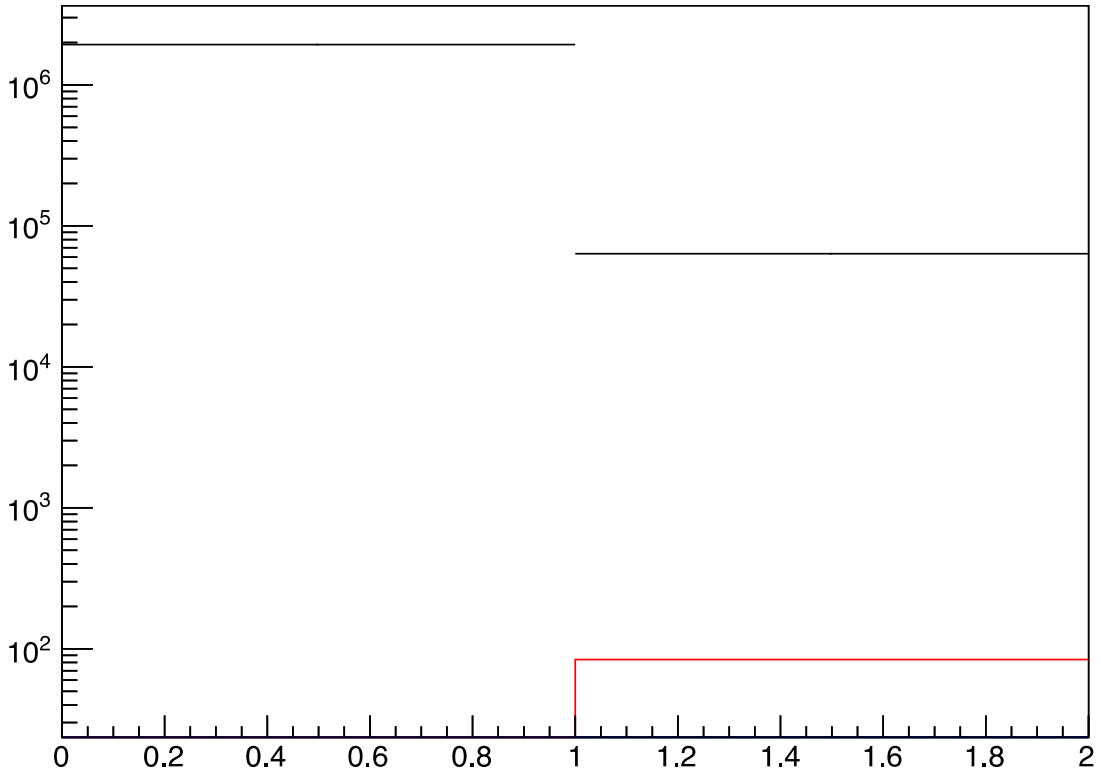


RPC_1: 2 bits

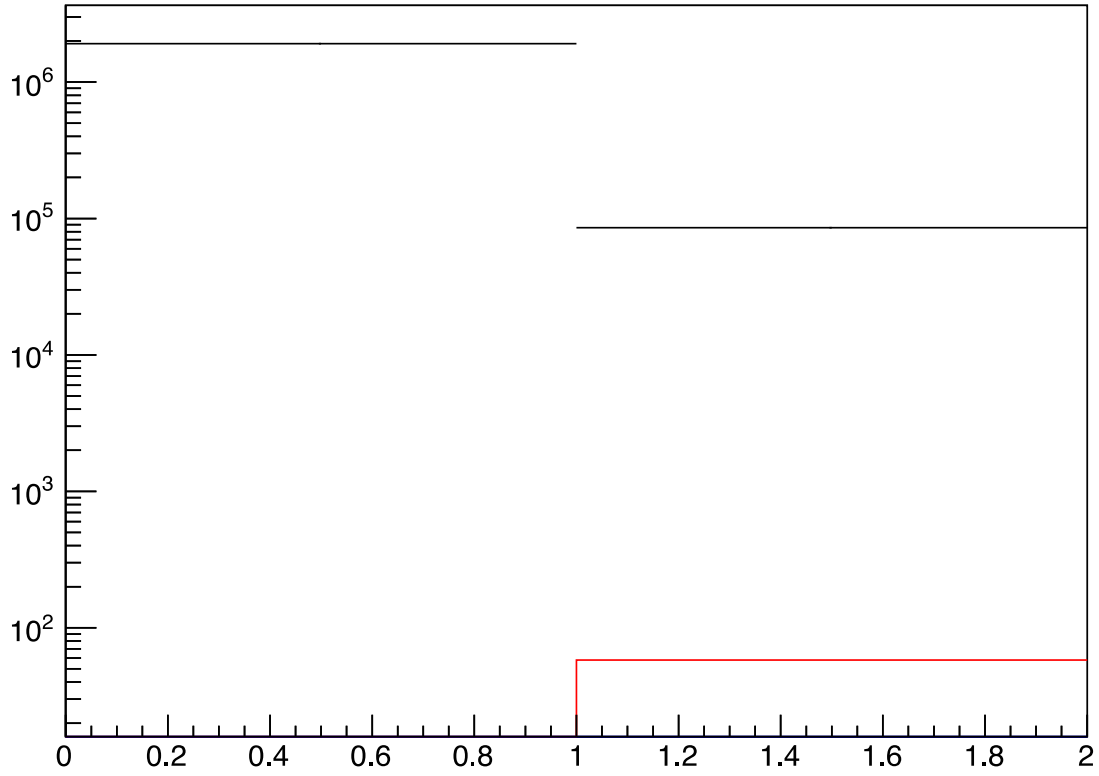
- Why allocating 2 bits for this?
  - Indicate if the LCT comes from St1_ring2?



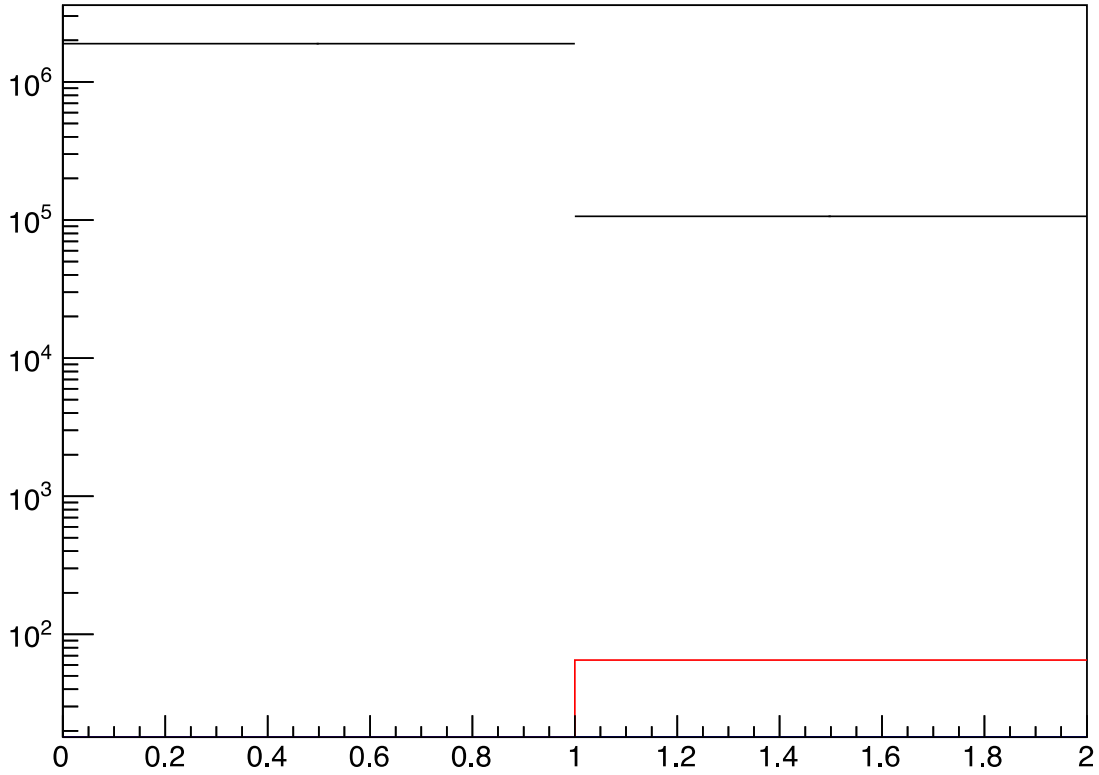
RPC_2: 1 bit



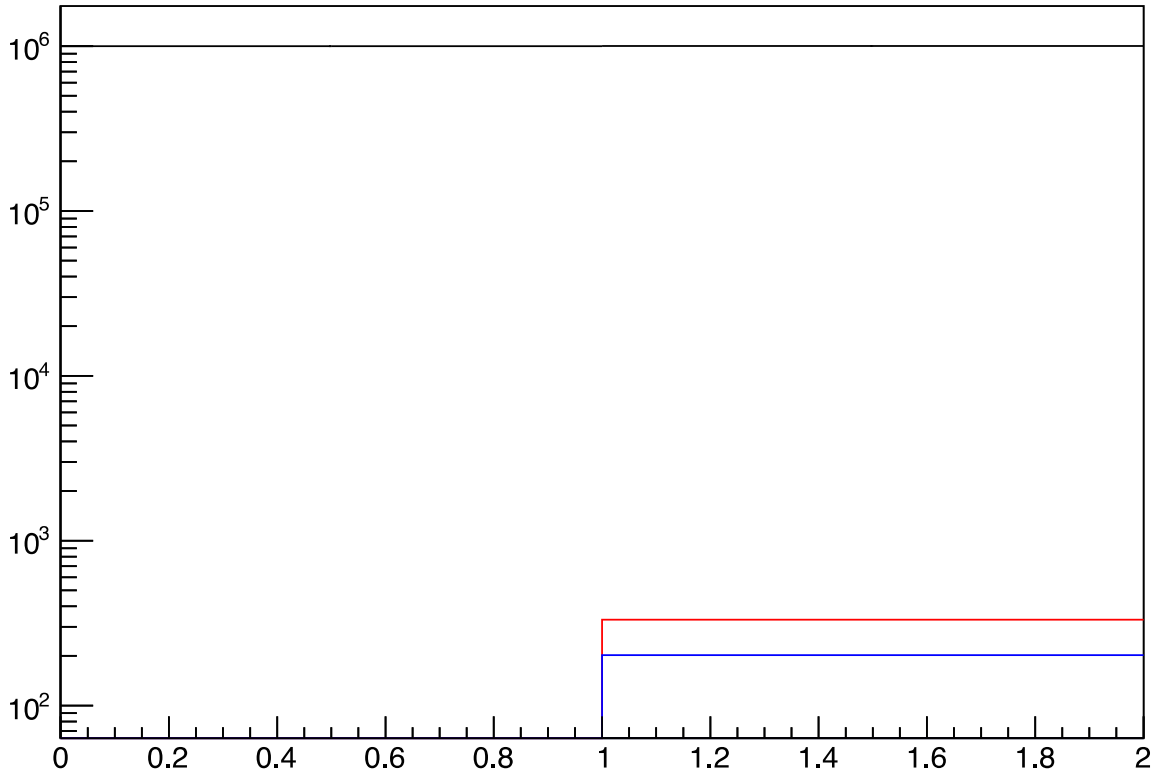
RPC_3: 1 bit



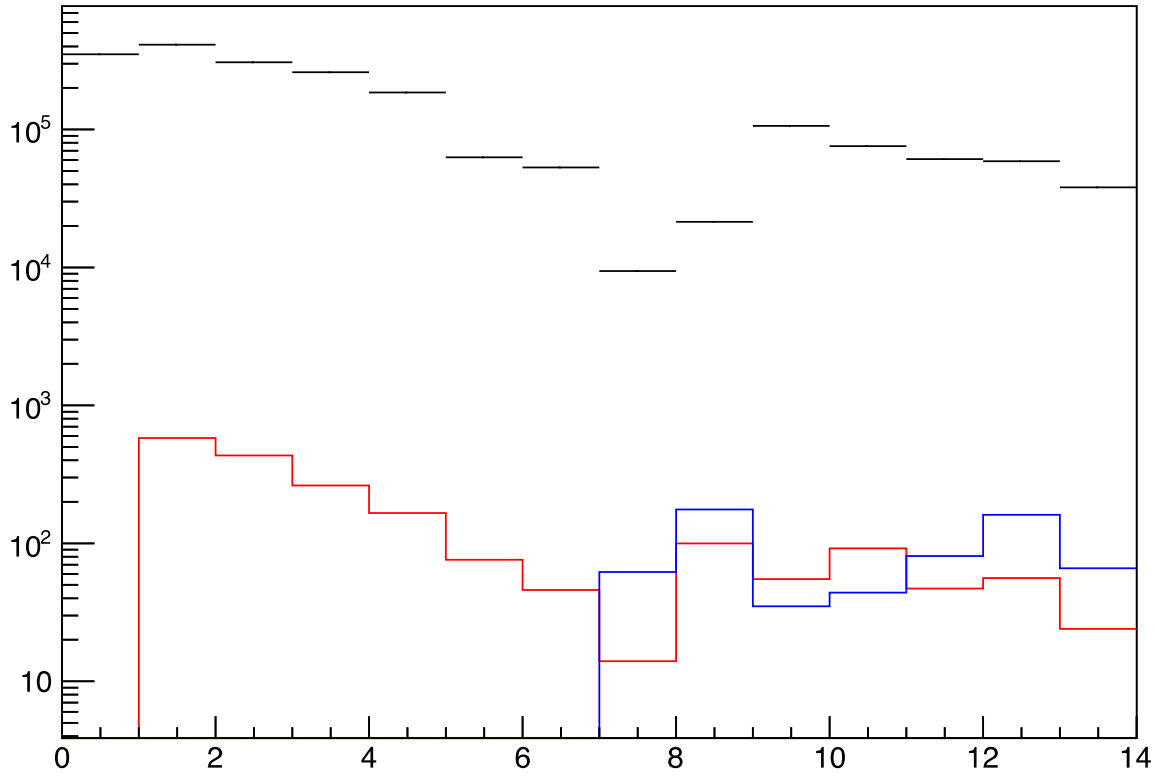
RPC_4: 1 bit



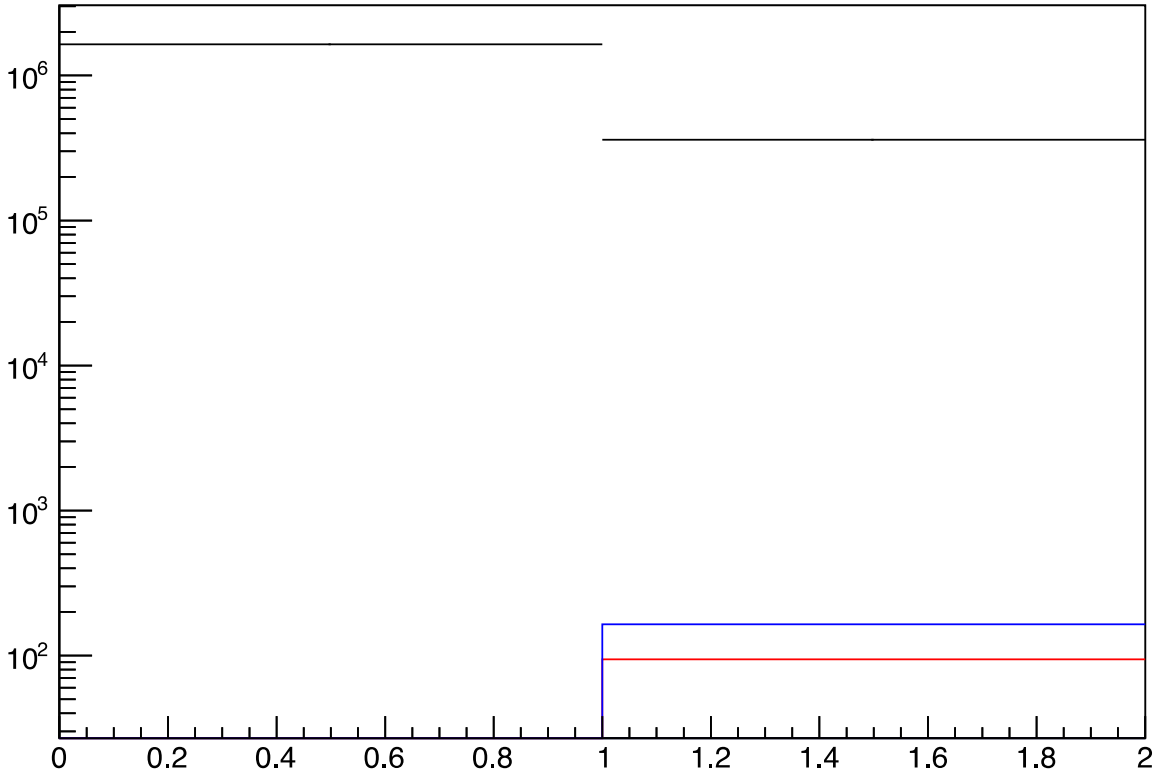
FR_1: 1 bit



Theta: 3 bits

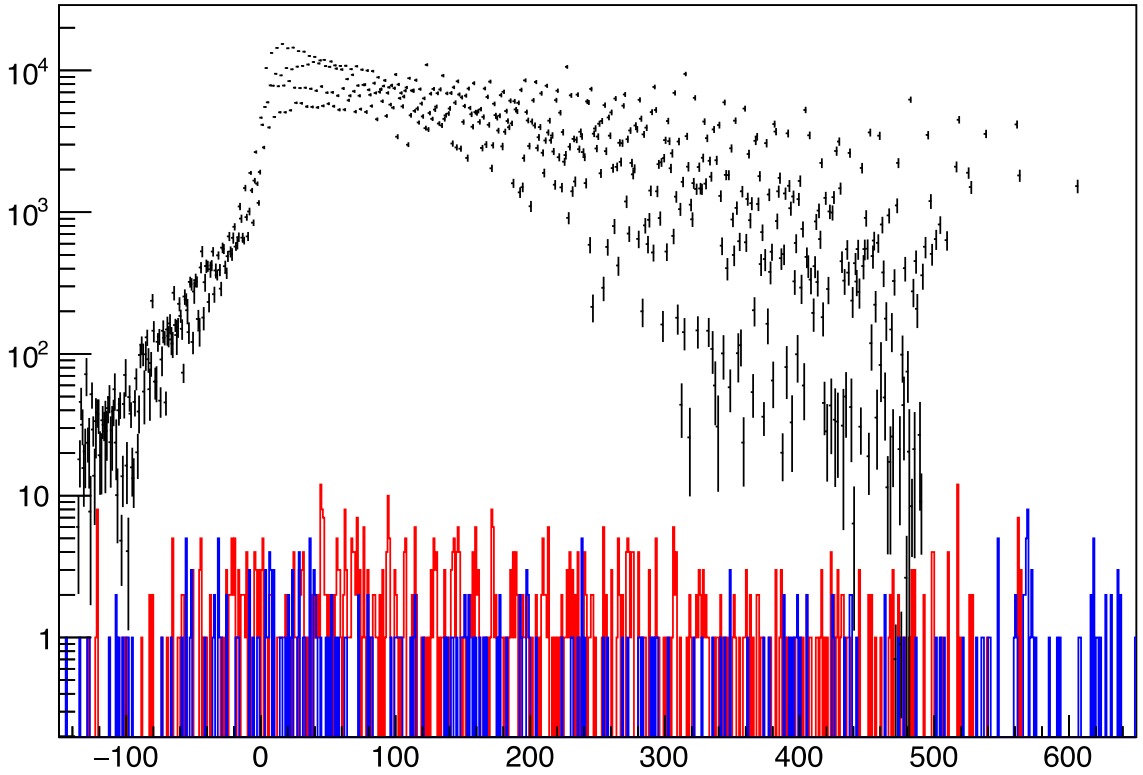


St1_ring2



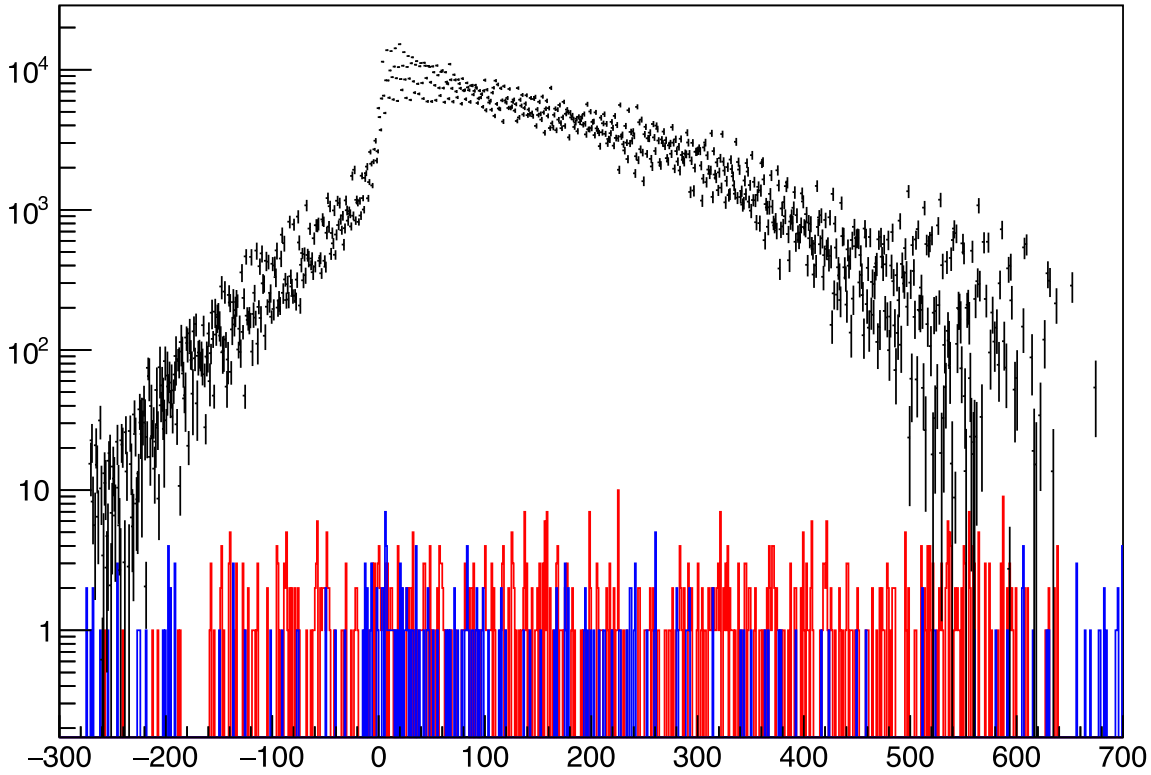
dPhi_13: no bits

- Xml file has cut on this variable, but not implemented?



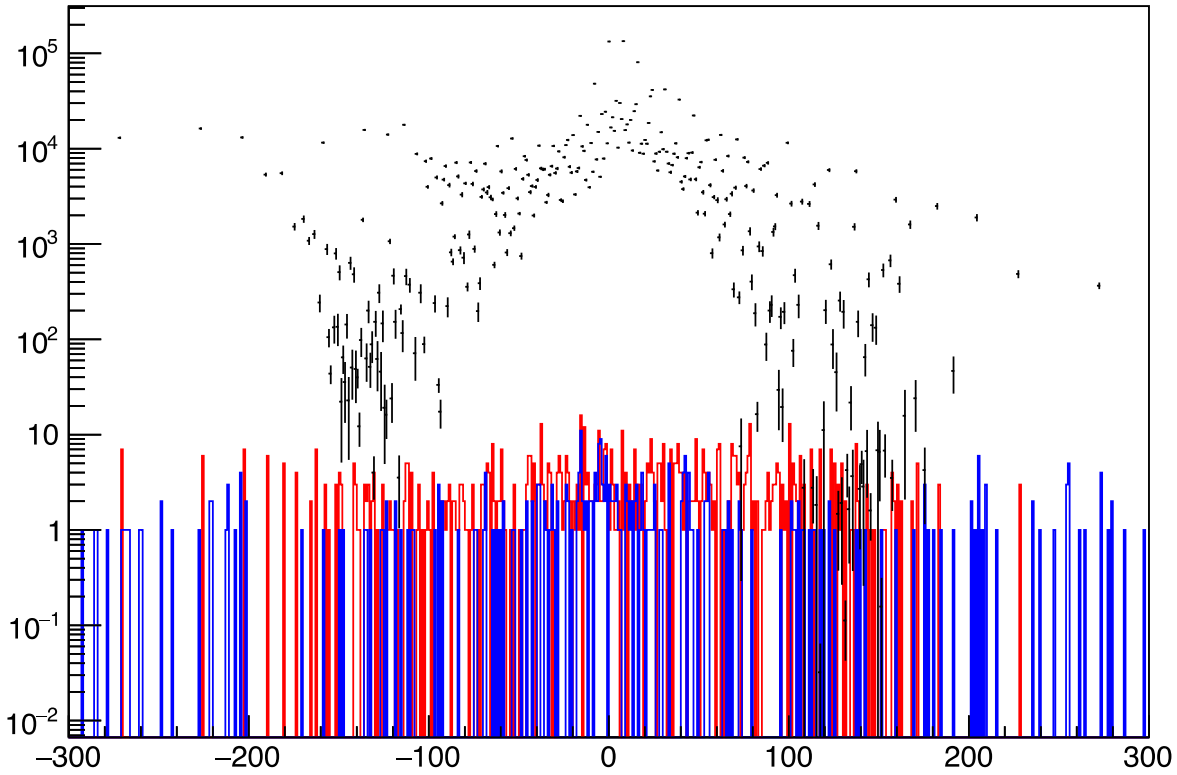
dPhi_14: no bits

- Xml file has cut on this variable, but not implemented?



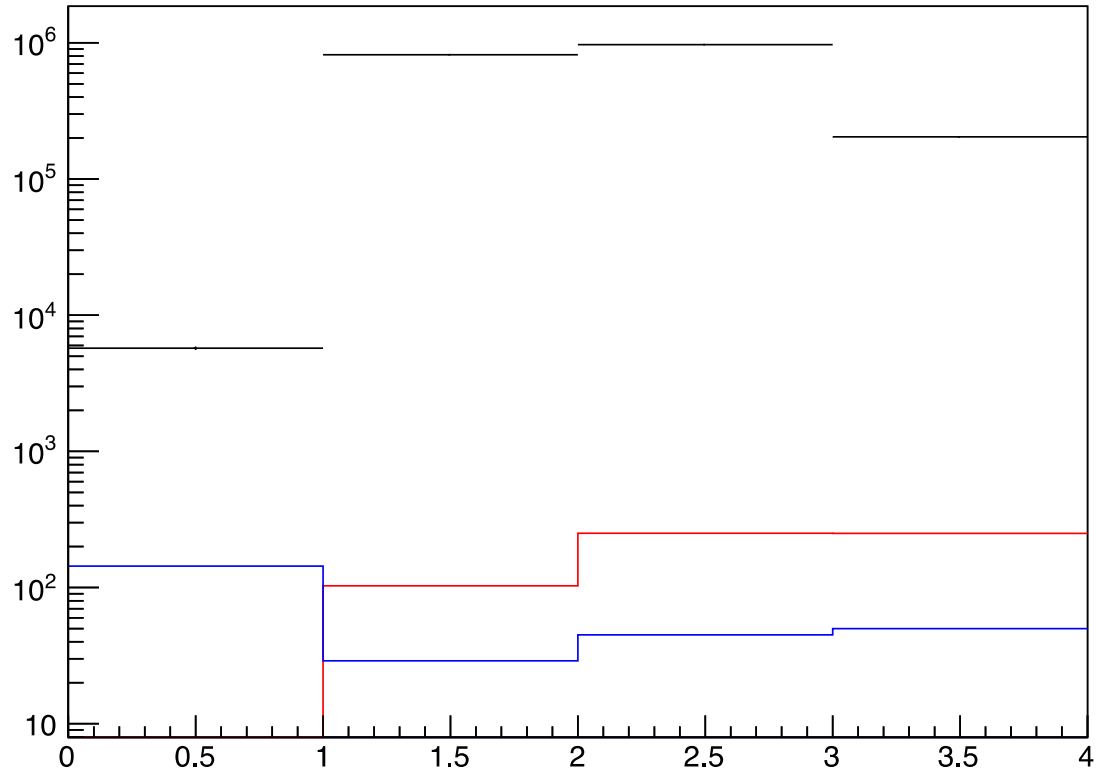
dPhi_24: no bits

- Xml file has cut on this variable, but not implemented?



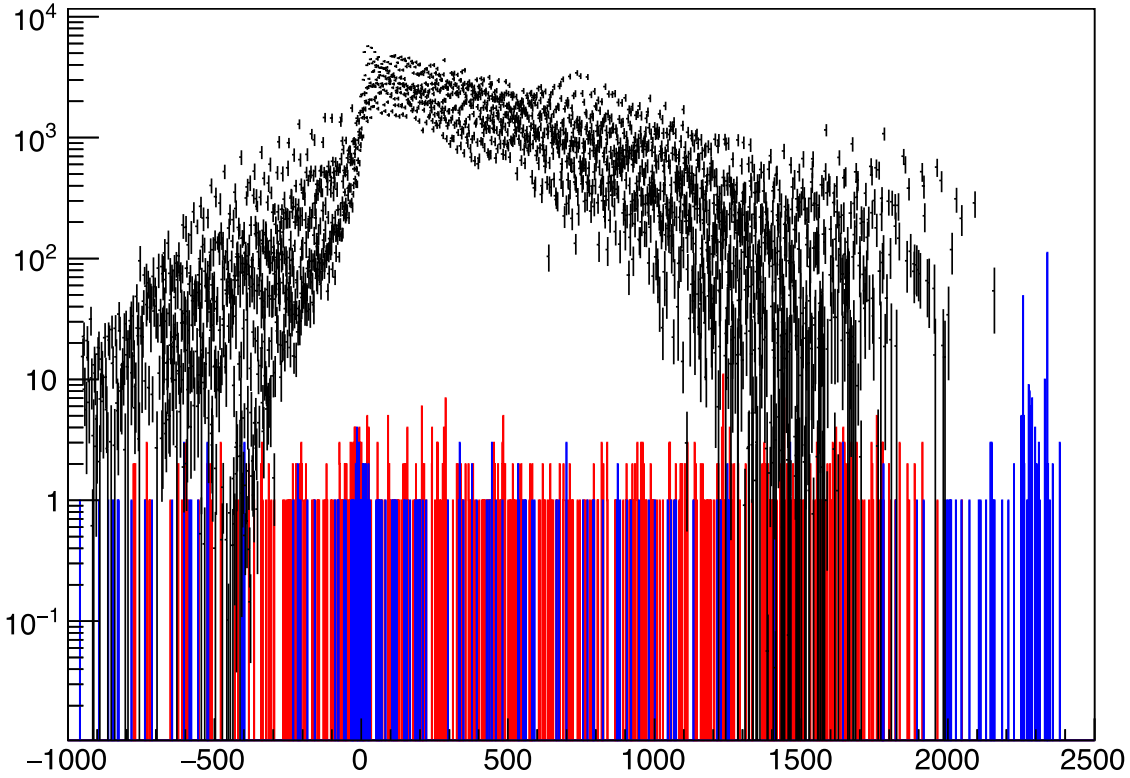
bend_1: no bits

- Xml file has cut on this variable, but not implemented?



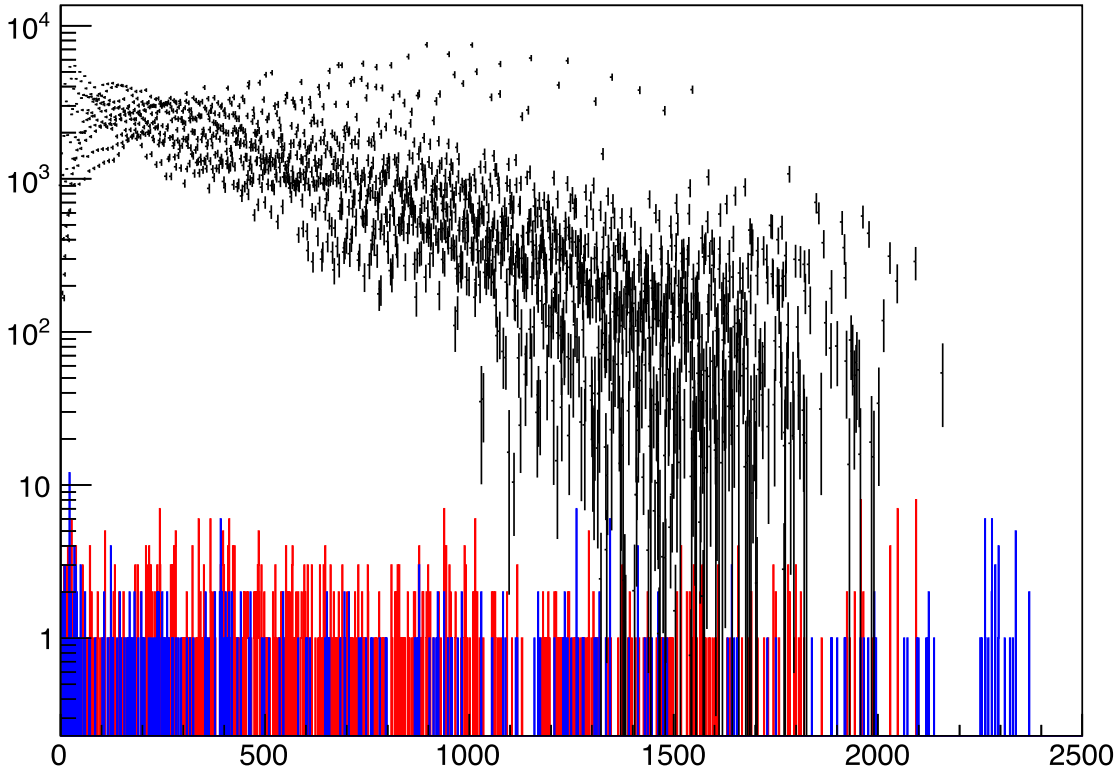
dPhiSum4: no bits

- Xml file has cut on this variable, but not implemented?



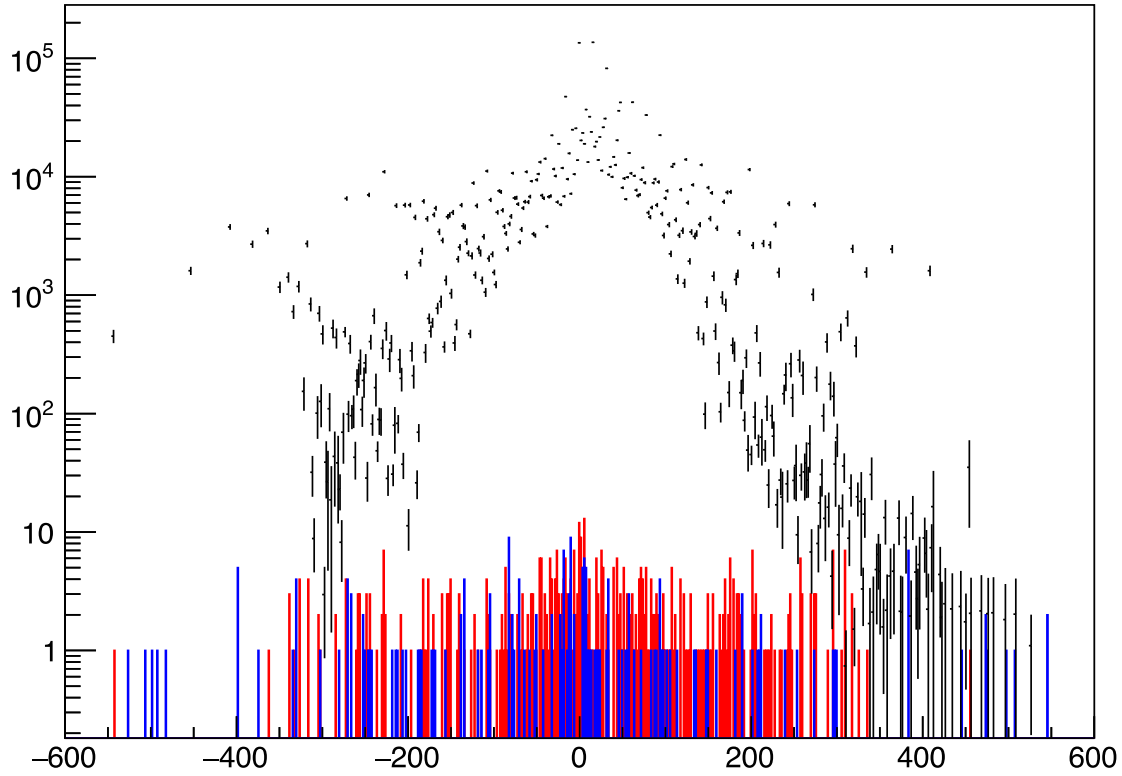
dPhiSum4A: no bits

- Xml file has cut on this variable, but not implemented?



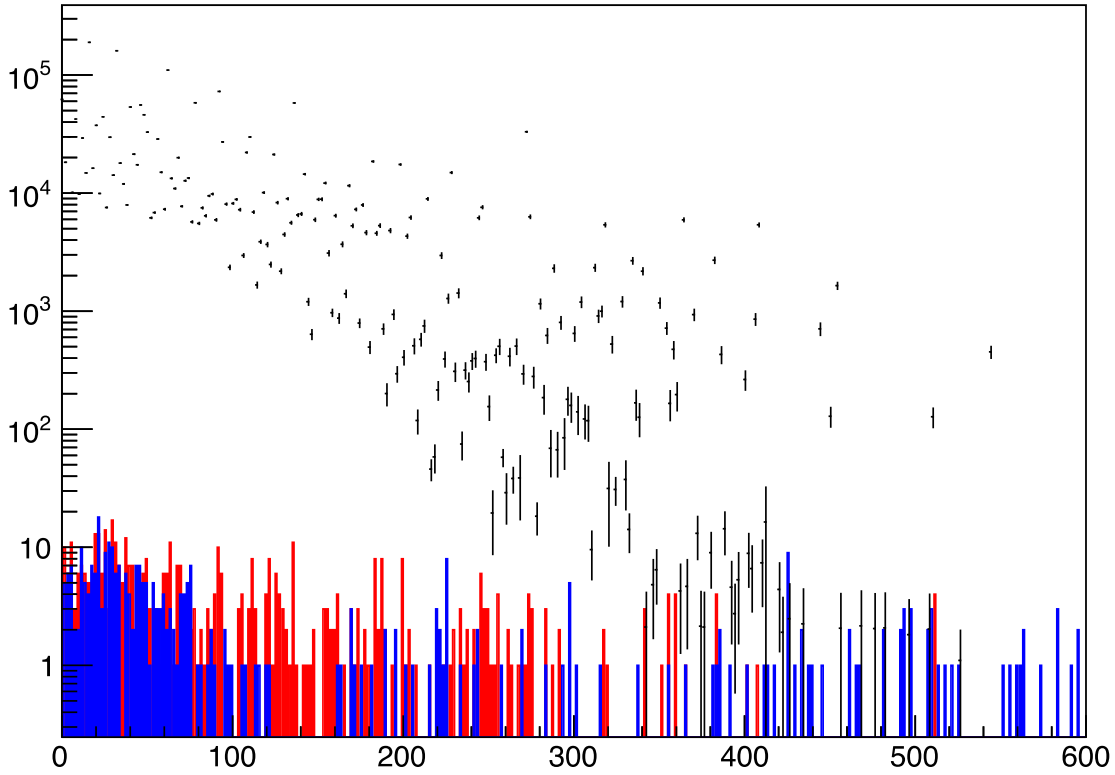
dPhiSum3: no bits

- Xml file has cut on this variable, but not implemented?



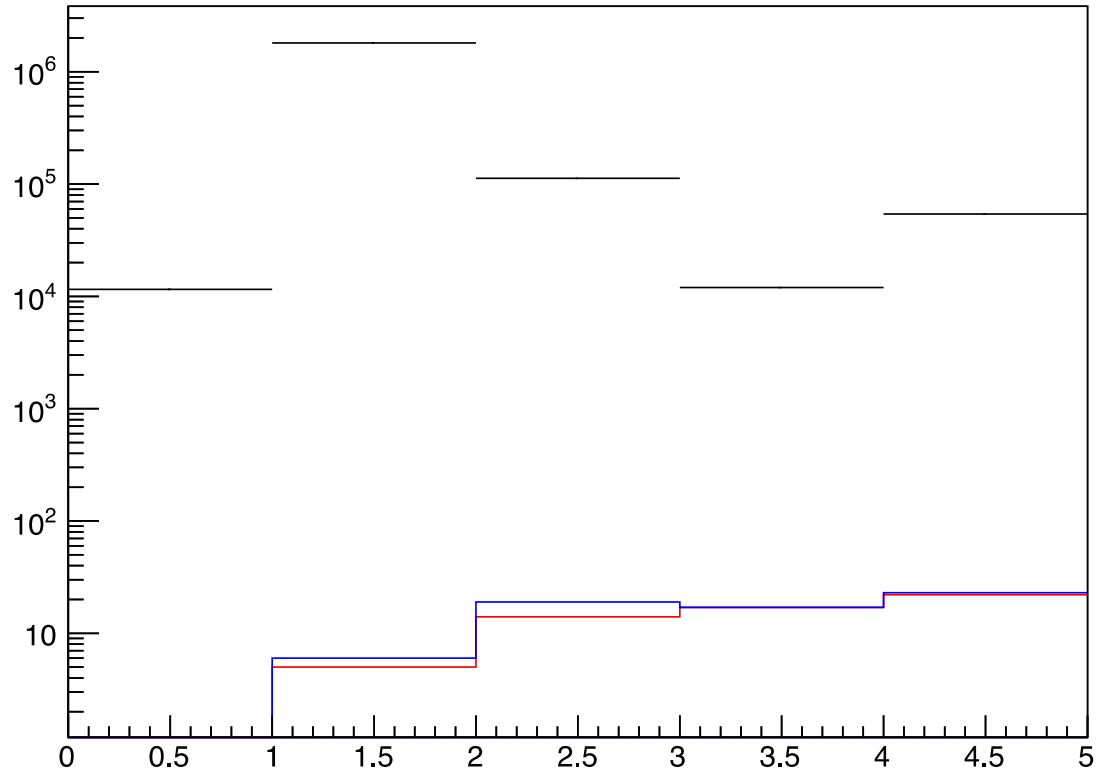
dPhiSum3A: no bits

- Xml file has cut on this variable, but not implemented?



outStPhi: no bits

- Xml file has cut on this variable, but not implemented?



Comments

- Why use 2 bits for the *sign*?
  - Encodes the signs of the later *dPhis* relative to the 1st *dPhi*
- How are current bits used across each variable range?
- Are there more transformations between the cut value from xml file and the bits represented value? (degree to int, etc.)

Back Up

Files

- Locations:
  - /afs/cern.ch/work/w/wshi/public/EMTFpTResolution/PtRegression_Apr_2017_05_10_invPtTarg_invPtWgt_MODE_15_bitCompr_RPC.root
  - /afs/cern.ch/work/w/wshi/public/EMTFpTResolution/XmlScan_Mode_15_invPtTarg_invPtWgt_bitCompr_RPC.root
  - /afs/cern.ch/work/w/wshi/public/EMTFpTResolution/XmlScan_MODE_15_logPtTarg_invPtWgt_noBitCompr_noRPC.root

Reference

[1]

Boosted Decision Trees in the CMS Level-1 Endcap Muon Trigger, http://cds.cern.ch/record/2289251/files/CR2017_361.pdf