Input Variable and NN cuts

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26 November 2007

Correlations in NN Output and Input Variables

- Method
  - Look at NN vs Input for HWW and backgrounds.
  - Find point in NN score above which majority of HWW resides. This is the critical score.
  - Determine range of Input variable where majority of HWW resides. This defines the input variable sensitive region.
  - Determine if there are background events populating this sensitive region and for which the background is below the critical score. A band at low NN score is best, indicative of another cut that forms a control region.

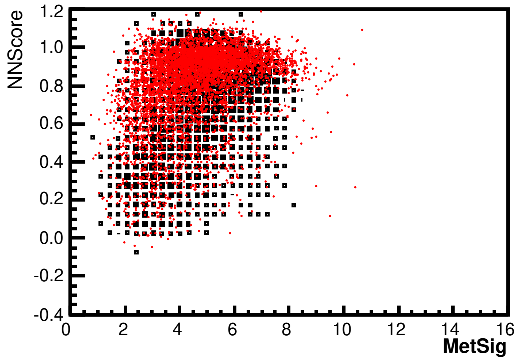
- Examine the data input distributions, blanking out events populating the region above the critical score. Compare to the background.

▶ Here we will look at MetSig and the six distributions with most separation of signal and background.

- Look at NN vs Input variable for HWW, WW and Data for two examples.
- Evaluate if there is sufficent background in the sensitive region.
- Results summarized at end, reamining graphs for variables with most separation in backup.

High S/B, 0,1 Jet, NN vs MetSig

Higgs



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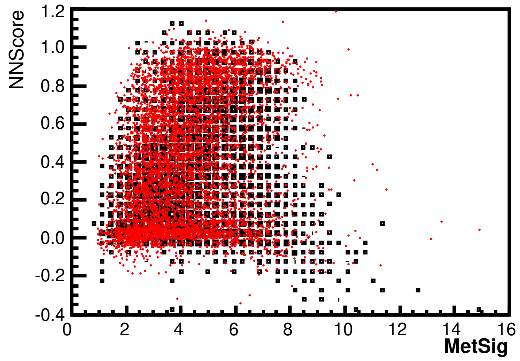

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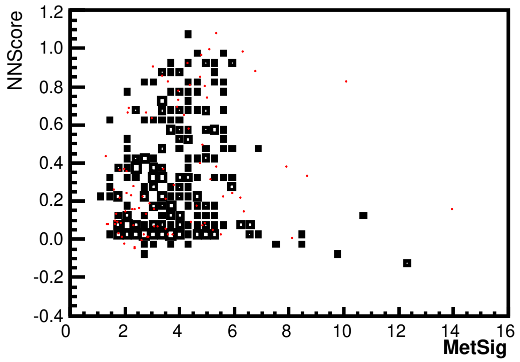
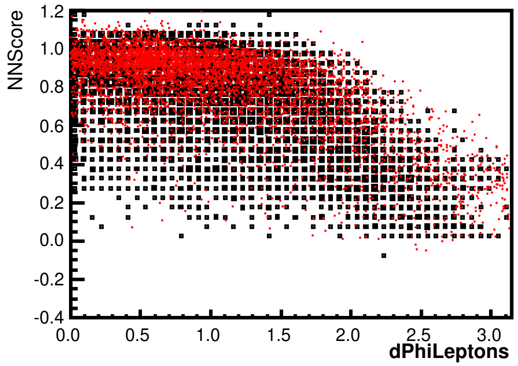


High S/B, 0,1 Jet, NN vs DPhiLeptons

Higgs



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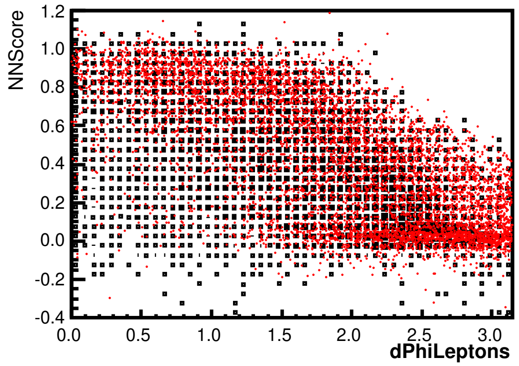

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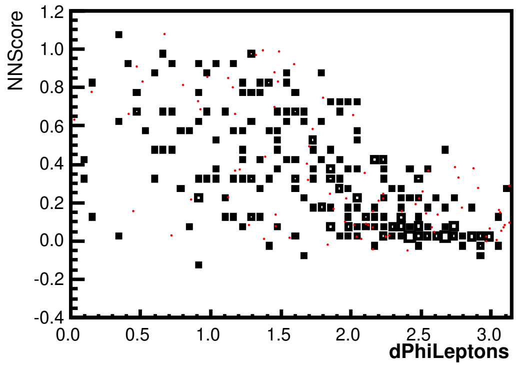


Summary

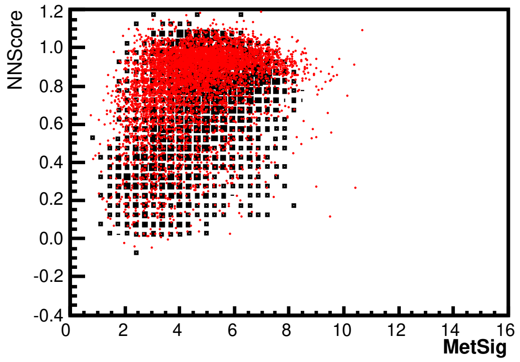
- **MetSig** Reasonable coverage of signal region with an interesting band in WW at NN=0)at least in 1 jet) that covers signal region nicely.
- **LRHWW** Some coverage at highest NN scores: not very good and it should not be!
- **dRLeptons** Coverage for small DR, signal region, is not very good, especially for 1 jet. This is a very powerful discriminant and as such is hard to find a good low NN score region with low DR.
- **dPhiLeptons** Again, as in dRLeptons, coverage is not very good at low dPhi.
- **dimass** Good coverage in signal region.
- **MetSpec** Good coverage with a band at low NN score

(at least in 1 jet).

- **Met** Good coverage with a band at low NN score (at least in 1 jet).

High S/B, 0,1 Jet, NN vs MetSig

Higgs



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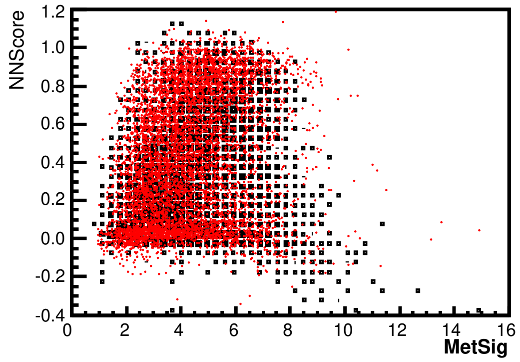

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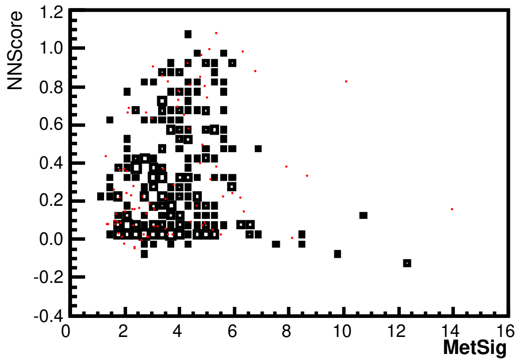
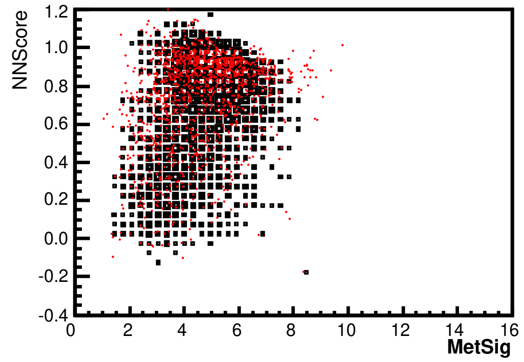


Low S/B, 0,1 Jet, NN vs MetSig

Higgs



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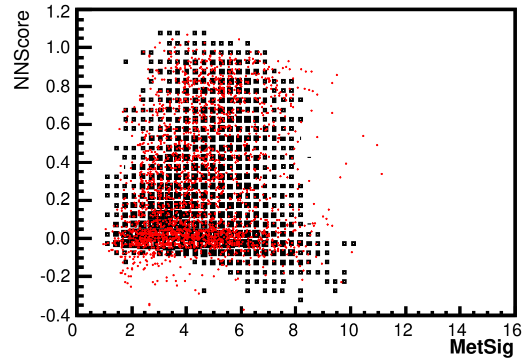

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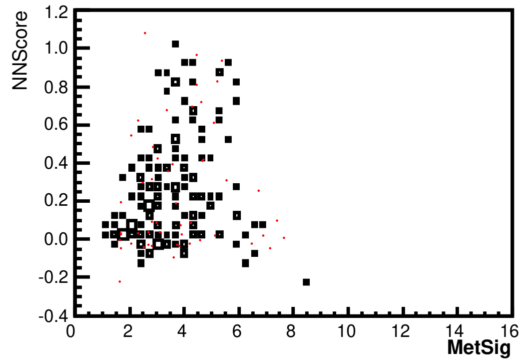
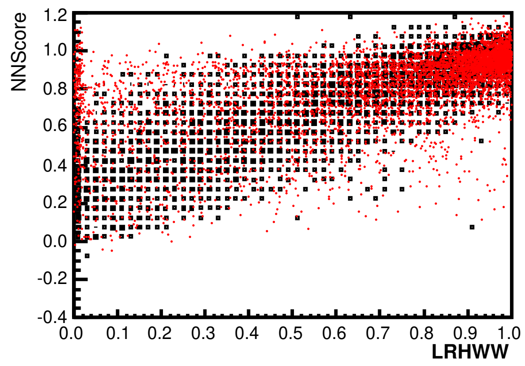


High S/B, 0,1 Jet, NN vs LRHWW

Higgs



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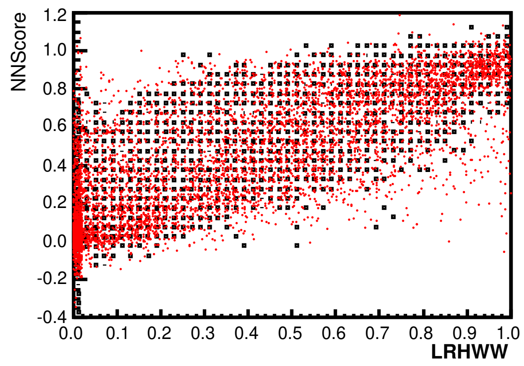

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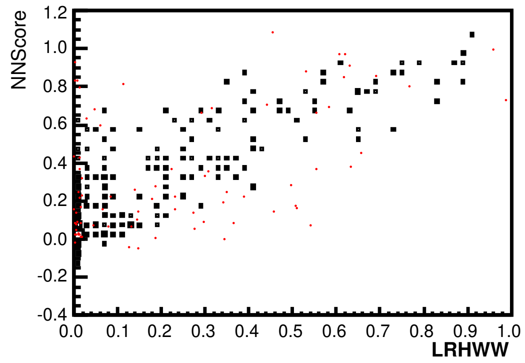
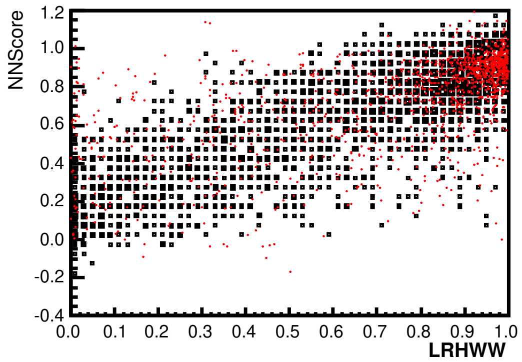


Low S/B, 0,1 Jet, NN vs LRHWW

Higgs



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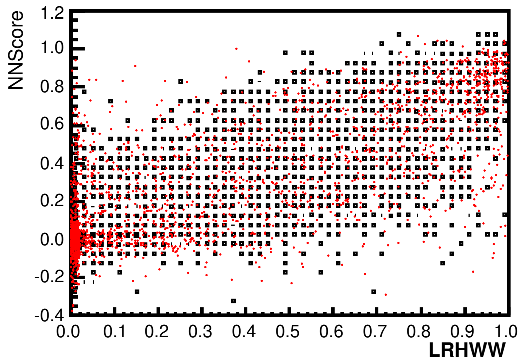

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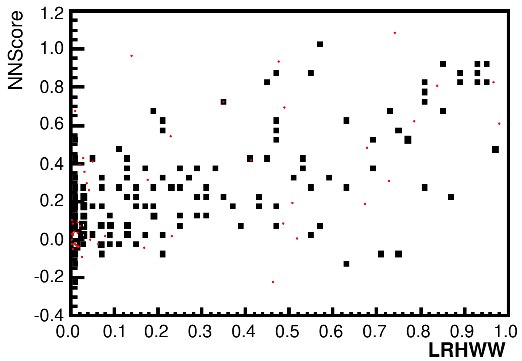
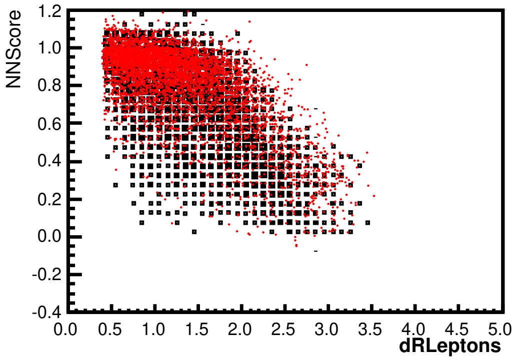


High S/B, 0,1 Jet, NN vs DRLeptons

Higgs



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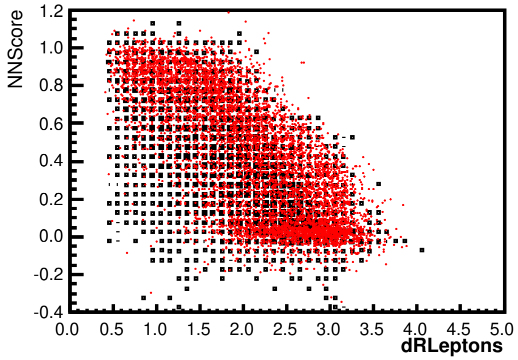

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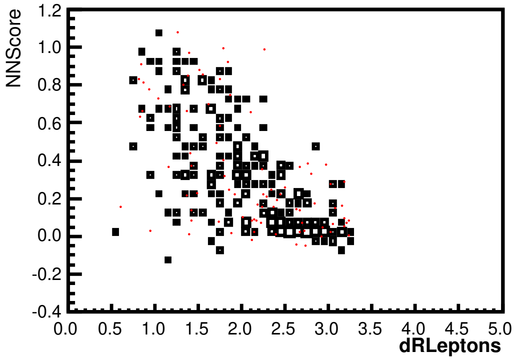
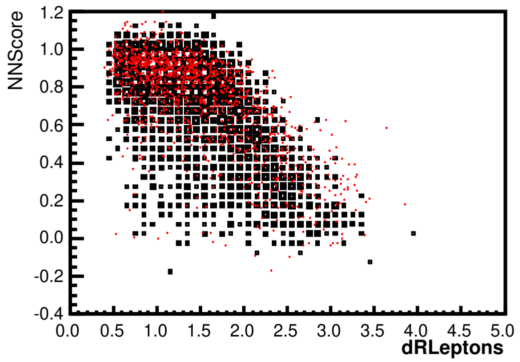


Low S/B, 0,1 Jet, NN vs DRLeptons

Higgs



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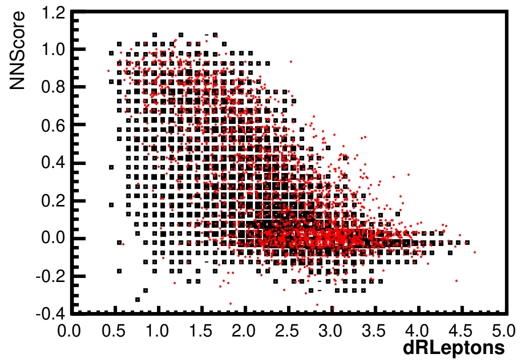

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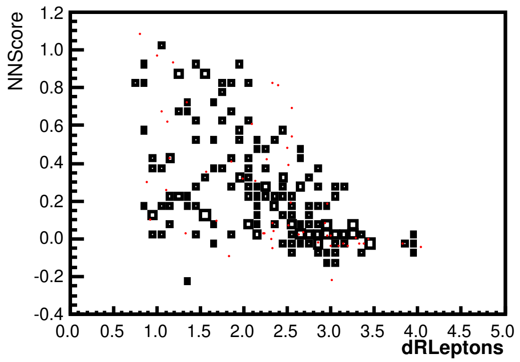

High S/B, 0,1 Jet, NN vs DPhiLeptons

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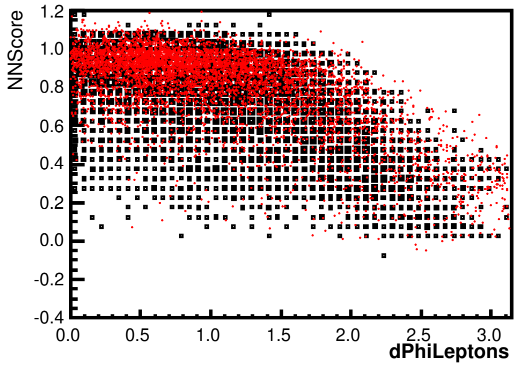

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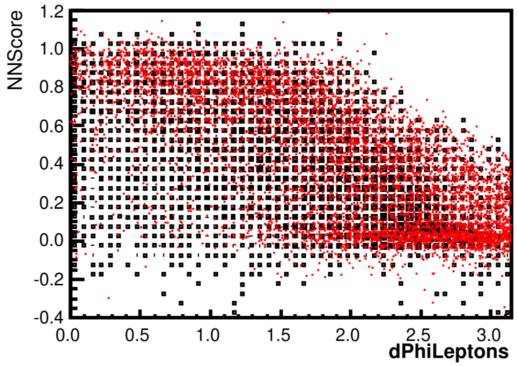

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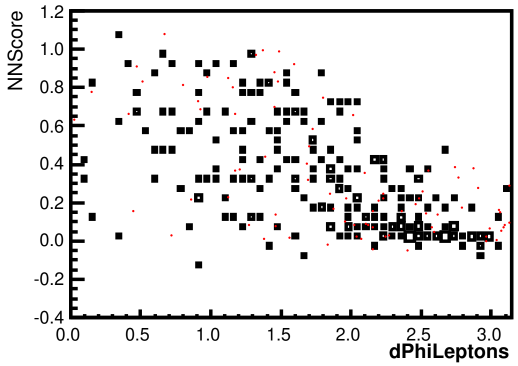
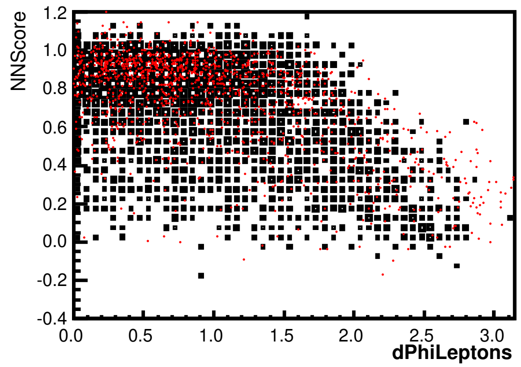


Low S/B, 0,1 Jet, NN vs DPhiLeptons

Higgs



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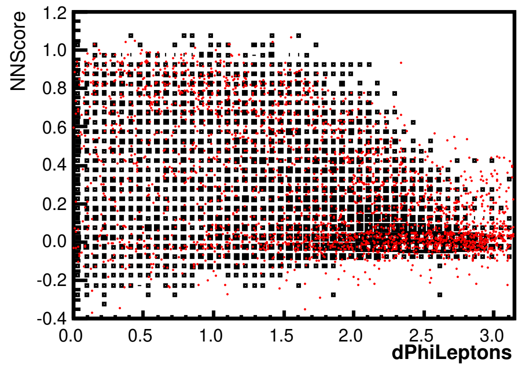

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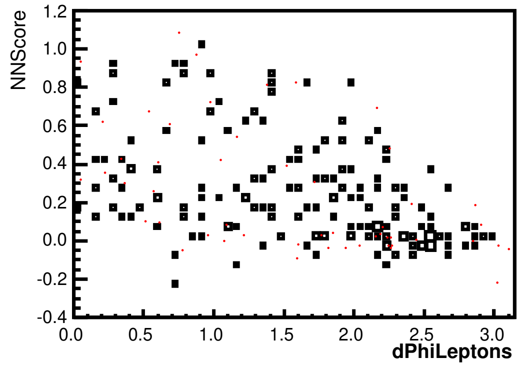
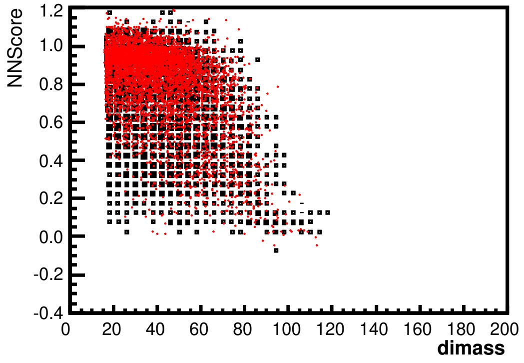


High S/B, 0,1 Jet, NN vs Dimass

Higgs



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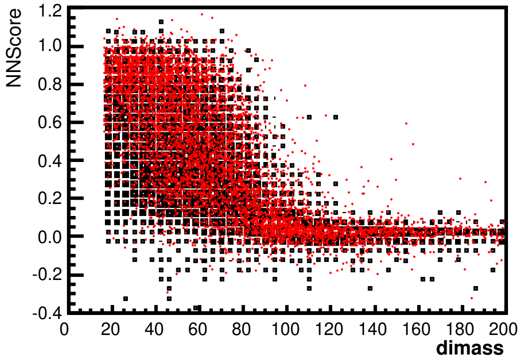

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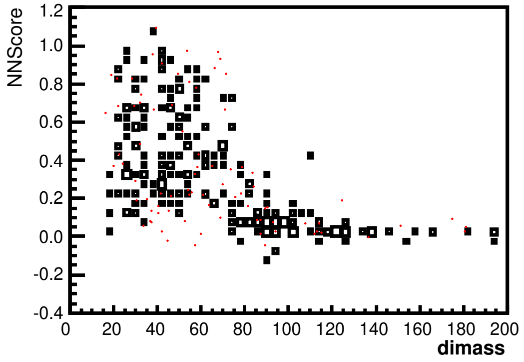
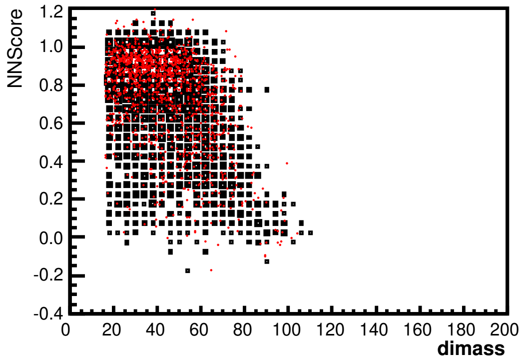


Low S/B, 0,1 Jet, NN vs Dimass

Higgs



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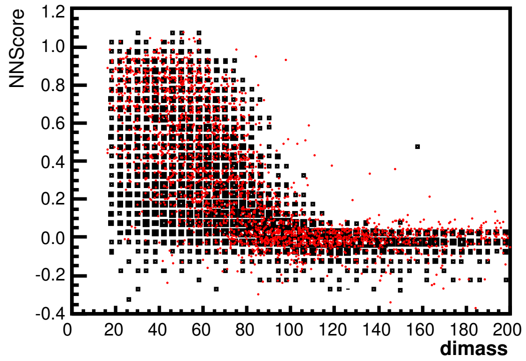

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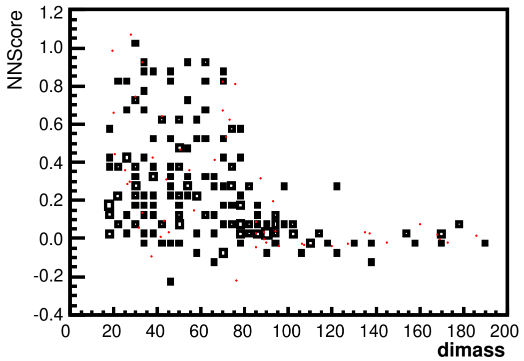
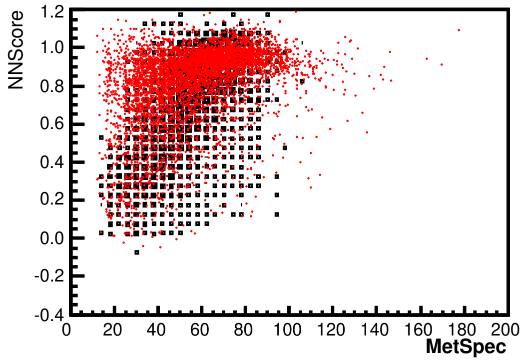


High S/B, 0,1 Jet, NN vs MetSpec

Higgs



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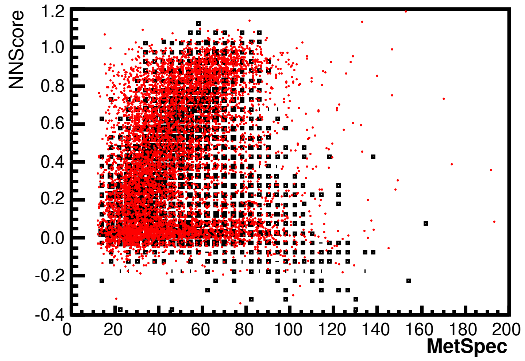

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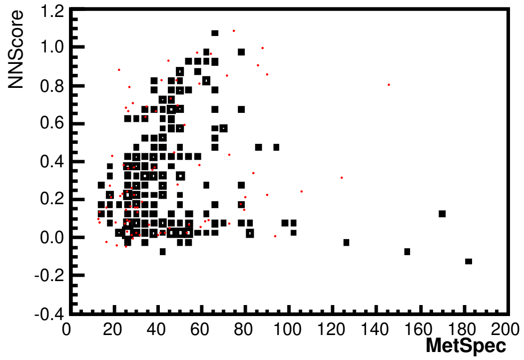
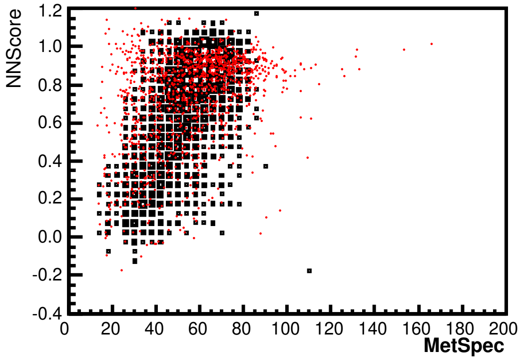


Low S/B, 0,1 Jet, NN vs MetSpec

Higgs



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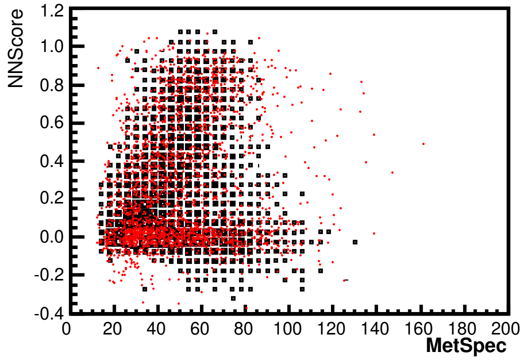

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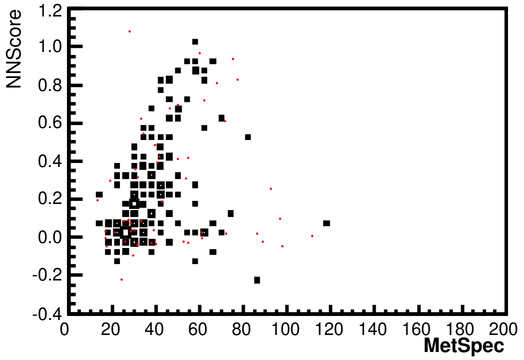
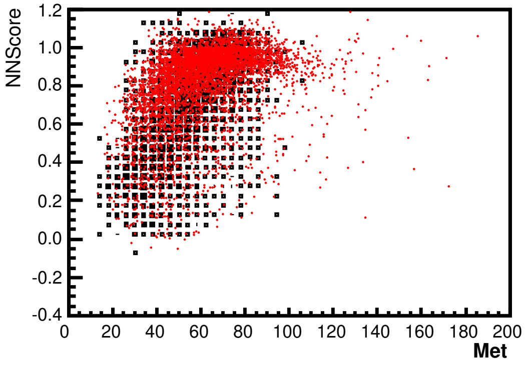


High S/B, 0,1 Jet, NN vs Met

Higgs



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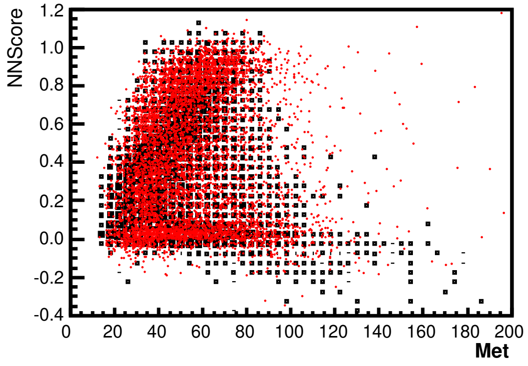

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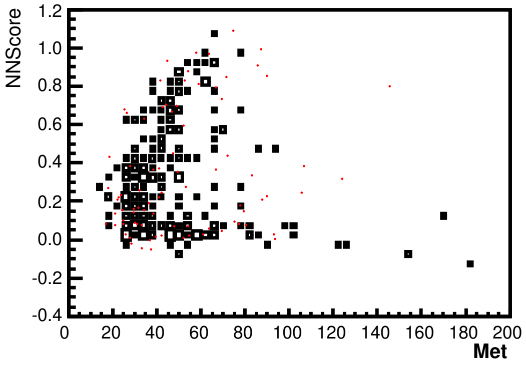

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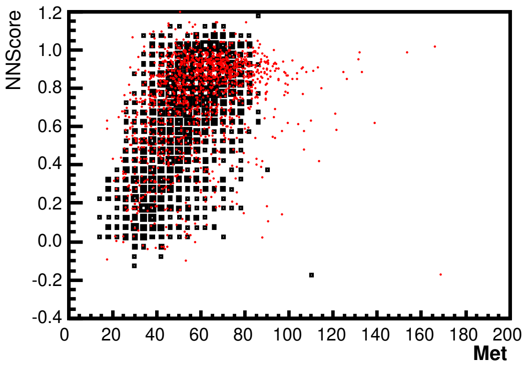

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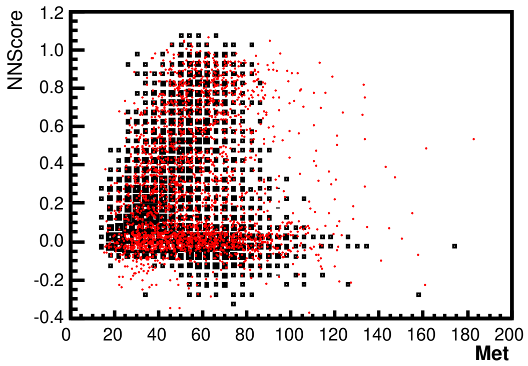

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