CVN Evaluation of Atmospherics ν

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CVN Evaluation of Atmospherics ν

★ The CVN was originally developed for beam analysis.

★ Interesting results for atmospherics.

★ It allows a straightforward analysis with reconstruction.

★ Cut based analysis, or use as Boosted decision tree variable.

★ Flavour, topology, neutrino/antineutrino …

★ Event → Pandora "nu" primary with at least one shower or track reconstructed.

Leonardo Peres | Boosted Dark Matter

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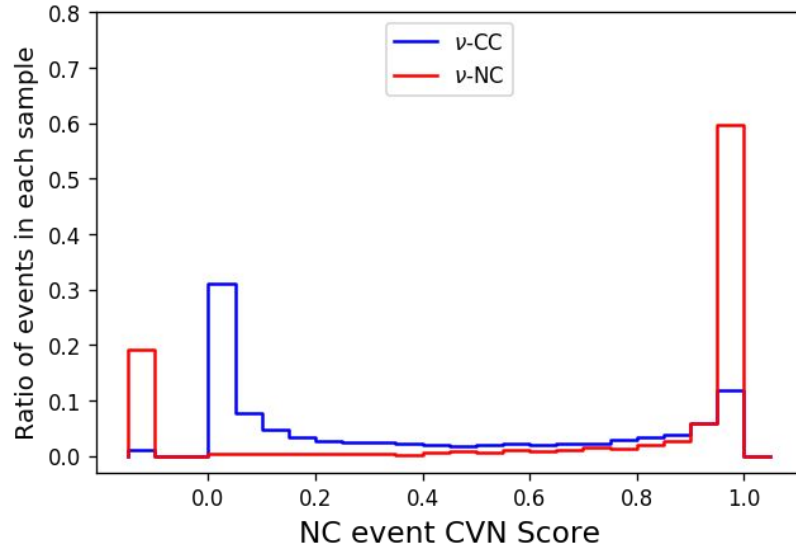
★ Good NC/CC separation.

★ A small part of the events does not return a score (initial negative values in the plot).

★ Classifying NC/CC events is essential for many physics analysis.

★ Best separation method found in the Boosted Dark Matter analysis.
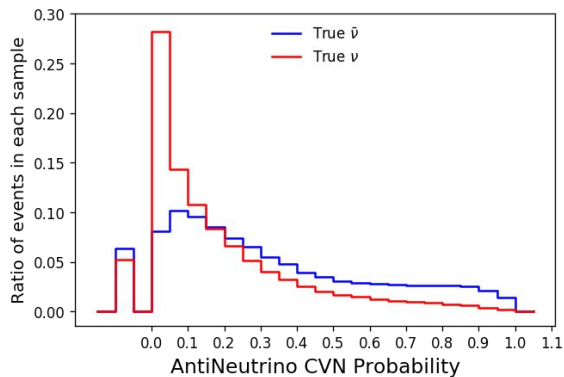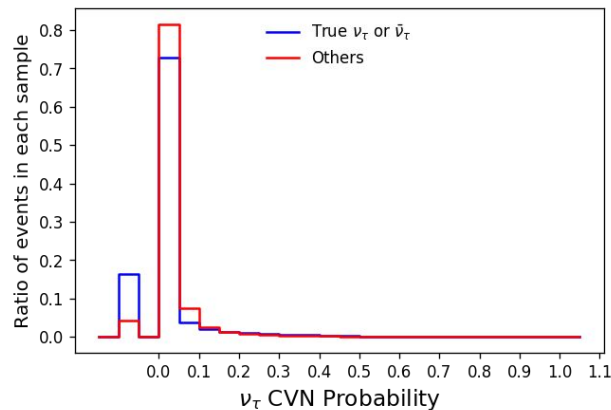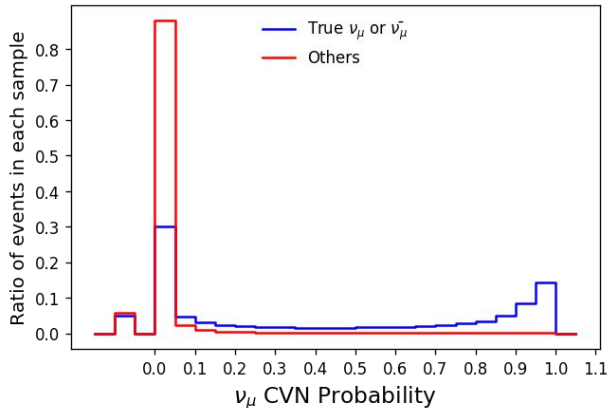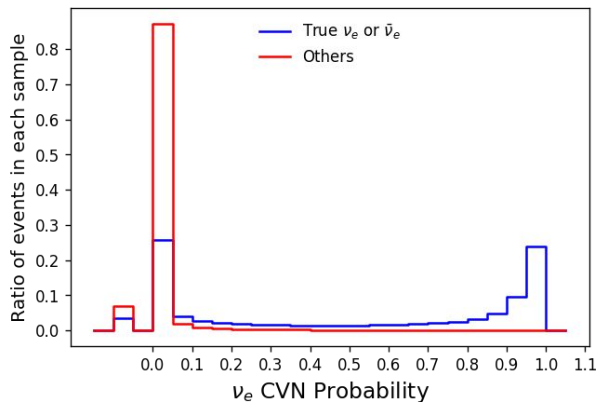   ○ Uses NC atm-nu as background.

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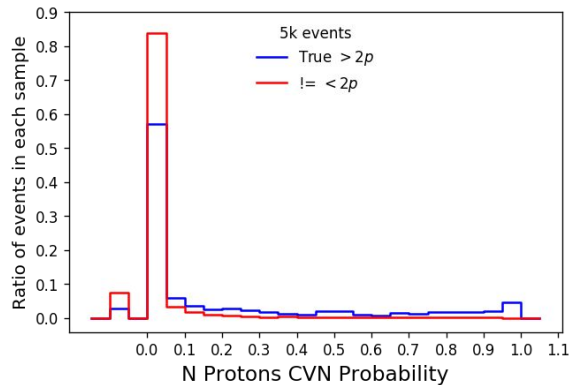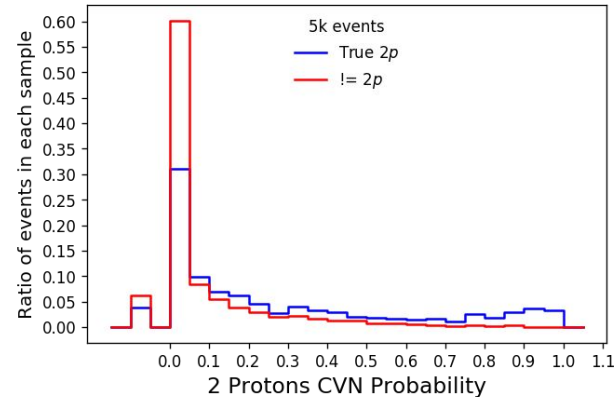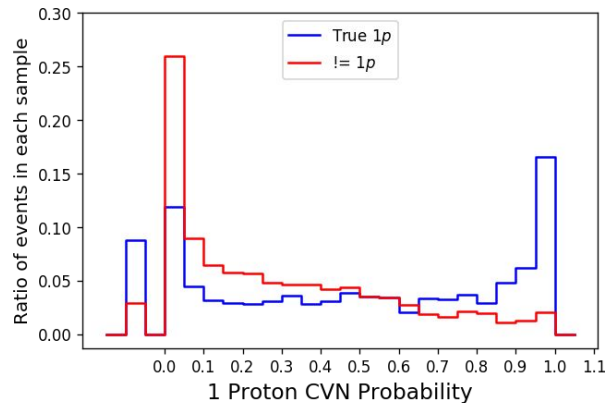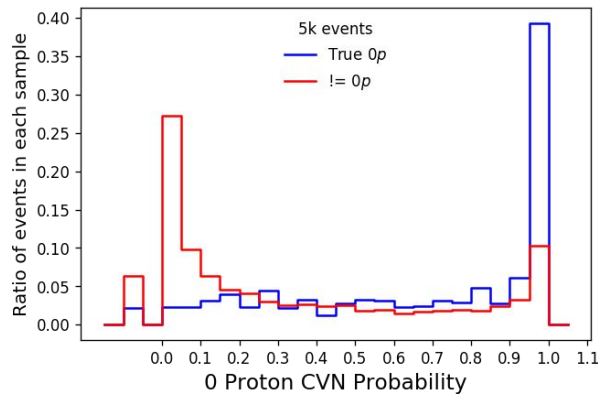
★ The CVN can be used, in principle, in studying atmospheric neutrino topologies.

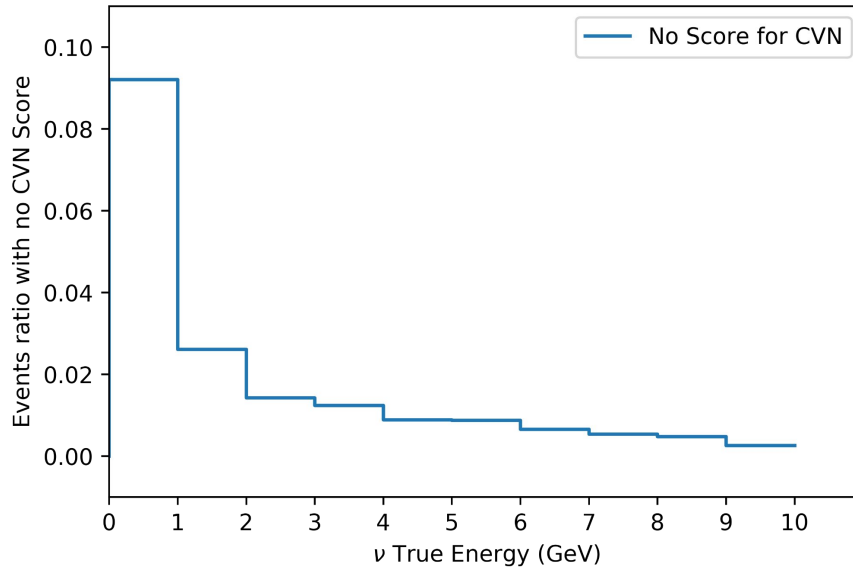 ○ Although, ~5-9% of the events is always discarded.
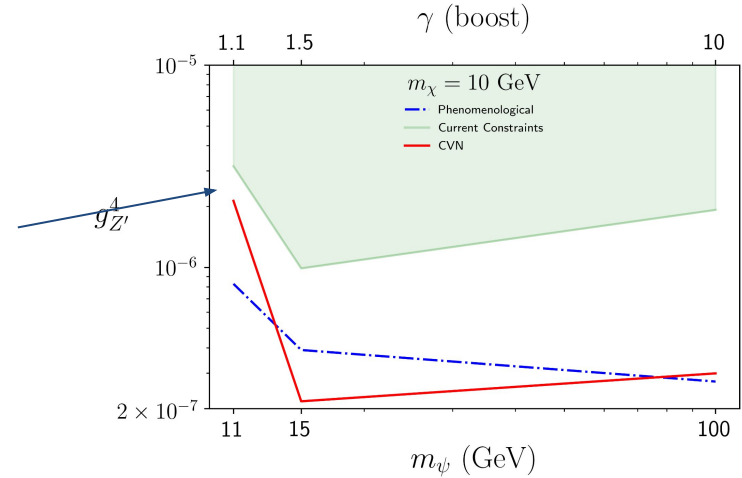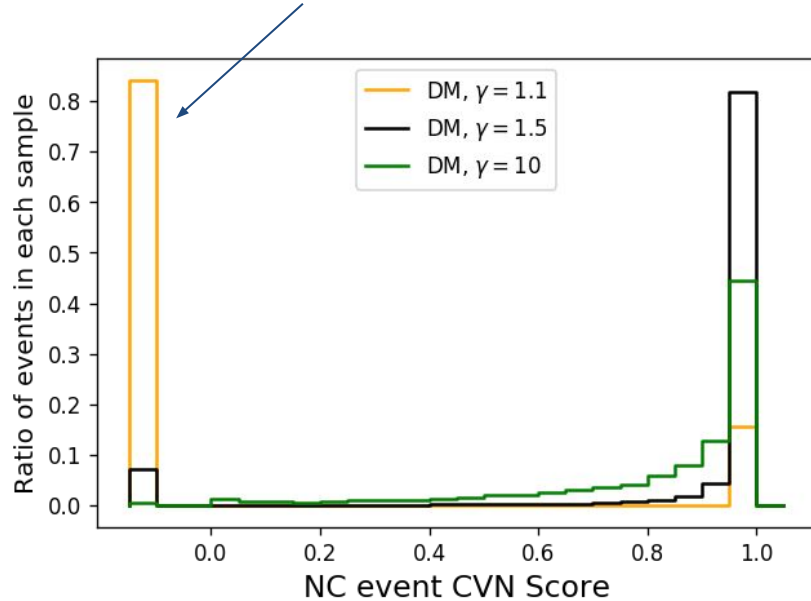
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★ Good separation for nu_e and nu_mu.

★ Not recommended for nu_tau analysis (in atmospherics).

★ Not very accurate for neutrino/antineutrino.

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★ [0,1] GeV represents ~50% of the events.

★ Sub-GeV region is essential for atmospheric studies.

   ○ CP violation and NSI.

CVN - Boosted Dark Matter (NC-like)

★ In the DM Analysis, the Lorentz factor is proportional to the energy of the particle.

★ There is no score for ~85% of lowest energetic DM particle, which gives the less competitive sensibility.

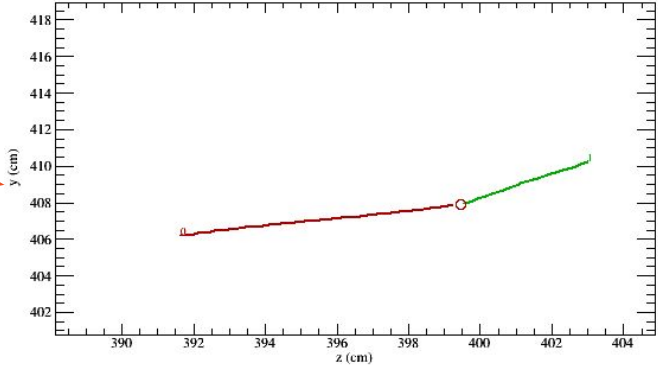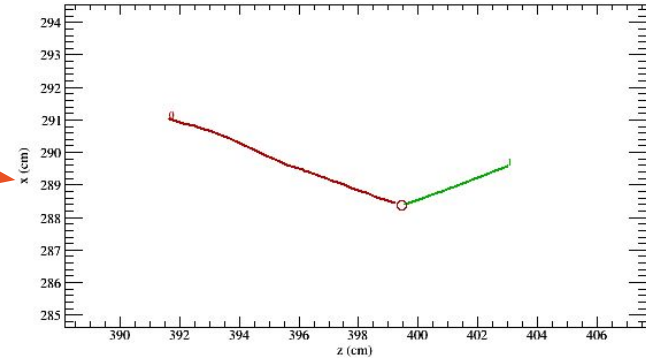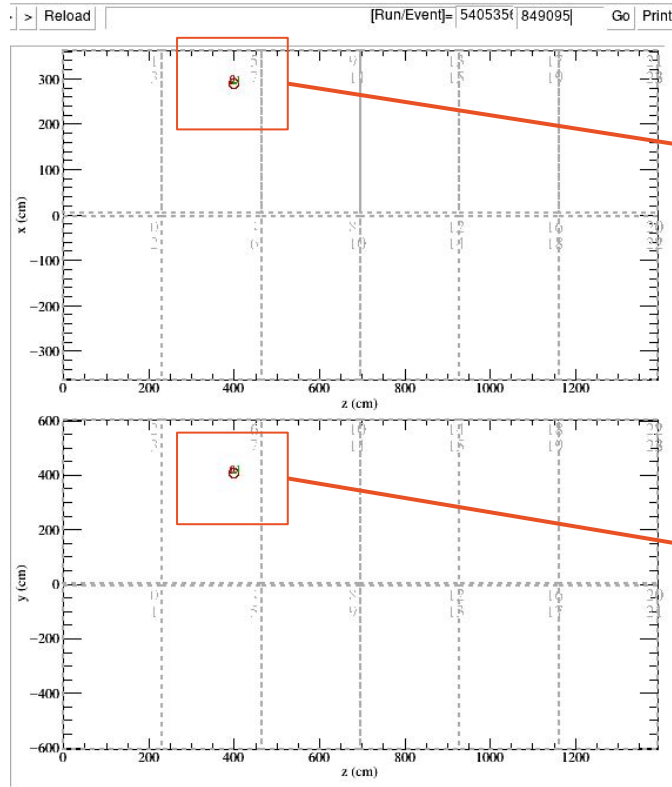★ CVN works very well separating NC/CC atm-nu for background.

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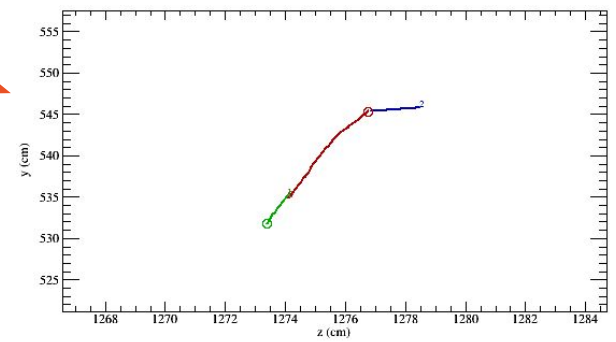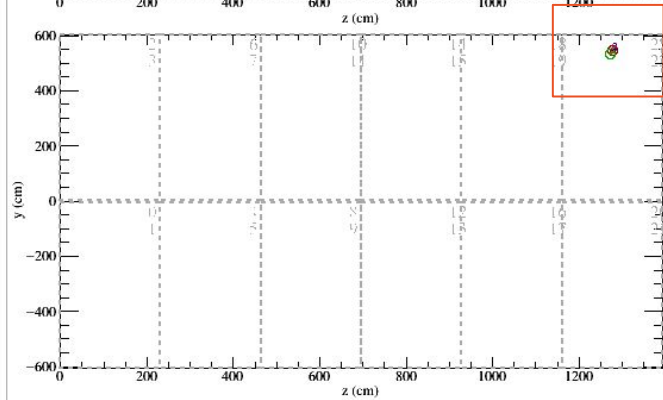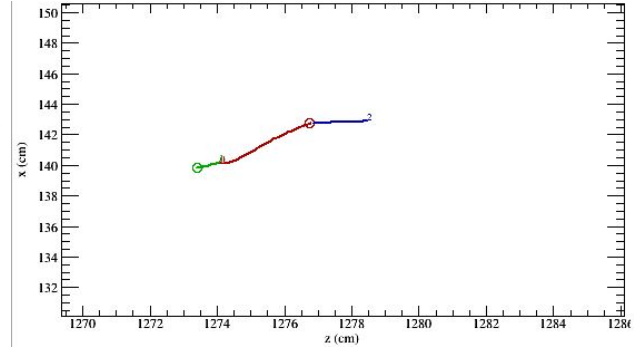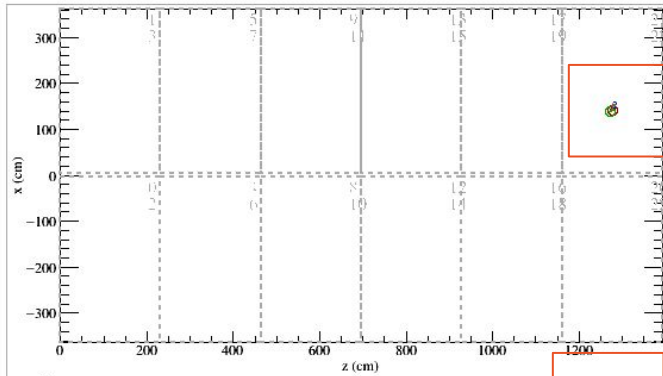
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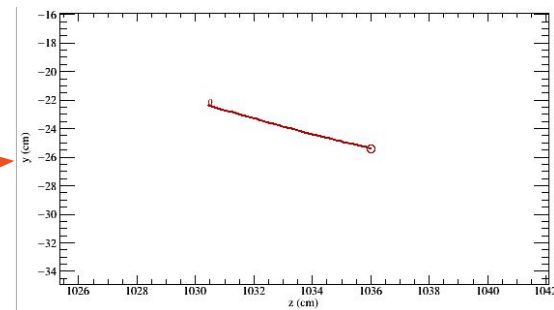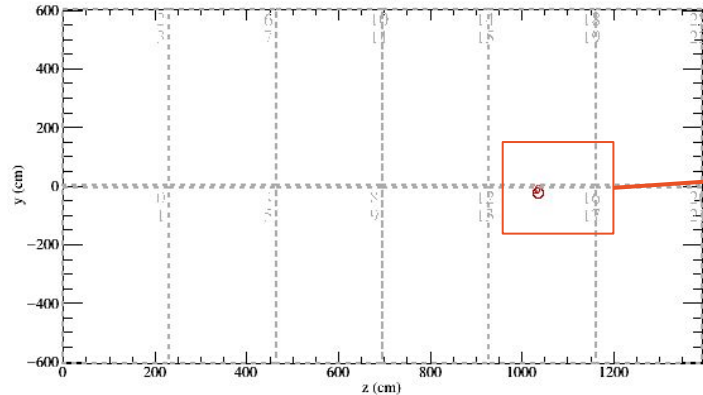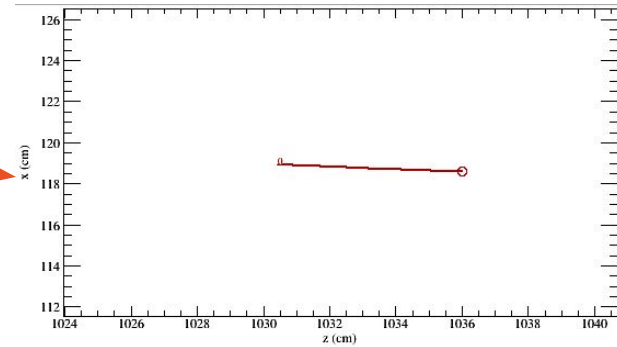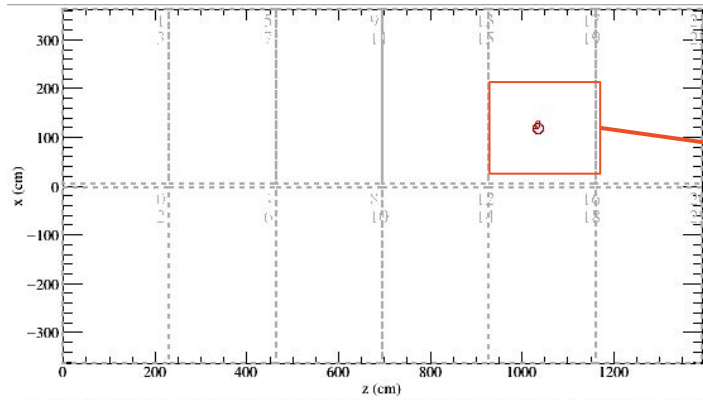
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Conclusion

★ The CVN can be an important tool for Atmospherics analysis.

★ Events with no score are mainly low energy events.

★ The reason why some events do not have a score is not clear to me.

★ Please make comments.

★ Thank you!