

## X. Further reading and project ideas

We've only just touched the surface of the subject here and there are a much wider range of application than we have considered

Don't forget to checkout the tensorflow and kaggle tutorials

<https://www.tensorflow.org/tutorials>

<https://www.kaggle.com/learn>

Also included there are a wide variety of datasets (physics or otherwise) that you can use to find inspiration

## X. Further reading and project ideas

- understanding the techniques in the course: ability to choose the right tool for the problem at hand
- technical skills: demonstrate some ability to extend code from the given examples
- presentation skills: clearly explain ideas in 15 mins demonstration

NB: no requirement to be original research

There are also plenty of extensions of the simple example we have considered here

## Neural Networks for scattering amplitudes

- NN for hadron collider amplitudes. What happens when we go from  $e^+e^-$  to  $pp$ ?
- Can we improve the loss function to enhance collinear regions?
- Are we using the right input parameters? 4-momenta vs kinematic invariants

## Classifiers

- Particle identification with Boosted Decision Trees (new techniques to learn here of course...)
- Explore underfitting and overfitting (c.f. [https://www.tensorflow.org/tutorials/keras/overfit\\_and\\_underfit](https://www.tensorflow.org/tutorials/keras/overfit_and_underfit))
- CNNs for galactic images (plenty of data available e.g. <https://astronn.readthedocs.io/en/latest/#>)