

About the origin of the galactic centre excess by Bryan Zaldivar

One of the most active lines of research in astrophysics nowadays deals with the gamma-ray emission coming from the centre of our galaxy, where an excess over standard astrophysical expectations has been found, as measured by the Fermi-LAT instrument. The international community is studying whether such an extra emission is due to the long sought dark matter signal, or instead due to a population of millisecond pulsars. The latter is a class of point-like sources (PLS), other classes being quasars, or blazars, etc. The distribution of PLS in the sky is not very well known, especially around the galactic centre. Consequently, the predictions for the galactic centre excess turn out to be quite model dependent.

Depending on the student's interest, this TFM will allow her/him to learn about dark matter, and how to model its photon emission, as well as the one coming from the PLS. The latter can be done according to physical models, as well as from data-driven methods (Machine Learning). She/he will have the opportunity to work with real public data from the Fermi-LAT collaboration, and perform data analysis on it with a flexible level of complexity.