

## **New data helps astronomers unravel mystery of Dark Matter's nature**

Washington: A study has provided a deeper insight into the nature of the Dark Matter, which amounts to more than 80 percent of the universe, according to the indirect evidence provided by its gravitational effects.

In the project by University of Granada, scientists have used stars as particle physics labs: thanks to the high temperature inside stars, photons can turn into axions that escape to the exterior, carrying energy with them.

Results indicated that the emission of axions can significantly diminish the time for the central combustion of helium, the so called HB (Horizontal Branch) phase; the energy taken by axions was compensated with the energy provided by nuclear combustion, which leads to a much faster consumption of helium.

The high quality in the recent observation of globular clusters allows for the contrast between the results of the numerical observations conducted in this project with the actual data. By comparing the amount of stars observed in HB phase with the amount of stars watched in a different phase not affected by axions (such as the so called RGB, Red Giant Branch, phase) they have made an estimation about the maximum axion emission rate.

The production of axions relies on the constant coupling of axion-photon which characterizes the interaction between axion and photons. They have obtained a maximum limit for this constant which was more restrictive than those established so far, both theoretically and through experiments.

The authors of this research pointed out that the accuracy in the determination of the coupling constant through the method used critically depends on the accuracy with which the initial helium content within the stars in the globular cluster can be estimated.

The study is published in the journal Physical Review Letters.