The Dark Matter inside of Early Type Galaxies

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The study of Dark Matter in galaxies generates new knowledge about the formation of the Universe. Some research works have found that inside Early Type Galaxies (ETGs) there can be up to 30% of Dark Matter (Cappellari et al. 2006; Robertson et al. 2006; Koopmans & Treu 2010); nevertheless, more recent works have not found significant quantities of such matter (Nigoche-Netro et al. 2011; Nigoche et al. 2013). An important factor that explains this difference in results is the new discovery of the fact that the Initial Mass Function (IMF) is not universal (Capellari et al. 2012). The present project strives to corroborate or to reject what was found in previous works, through the analysis of the relation that exists between the stellar and virial masses, corrected according to a Non-Universal IMF (Dutton et al. 2013). Such masses come from a sample of 51,744 ETGs obtained from the ninth release of the Sloan Digital Sky Survey. It is assumed that any difference between both masses is due to Dark Matter. To determine the relation between the masses, linear regression methods (Isobe et al. 1990; Akritas & Bershady 1996) were used to estimate the presence of Dark Matter in ETGs. This research showed that there is no more than 21.7% of Dark Matter inside ETGs, which is a result that agrees, within the range of errors, with what was found in Nigoche et al. 2013 and raises new questions about Dark Matter and the formation and evolution of the Universe.

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