



Sensitivity of CTA to gamma-ray emission from the Perseus galaxy cluster

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This work is on behalf of the CTA Consortium. The presenter, Judit Pérez-Romero, is a 3rd year PhD researcher in the Instituto de Física Teórica (IFT UAM-CSIC) in Madrid, under the supervision of Miguel Ángel Sánchez-Conde. This work is the result of the efforts of the CTA Galaxy Cluster Task Force and the Dark Matter and Exotic Physics (DMEP) working group.

In this work, we estimate the sensitivity of the Cherenkov Telescope Array (CTA) to detect diffuse gamma-ray emission from the Perseus galaxy cluster, both from interactions of cosmic rays (CR) with the intra-cluster medium, or as a product of annihilation or decay of dark matter (DM) particles in case they are weakly interactive massive particles (WIMPs). The observation of Perseus constitutes one of the Key Science Projects to be carried out by the CTA Consortium. In this talk, we will focus on the DM-induced component of the flux. Our DM modeling includes the substructures we expect in the main halo of Perseus, as predicted within the standard cosmological model hierarchical structure formation scenario, which will boost the annihilation signal significantly. We compute the expected CTA sensitivity using a likelihood maximization analysis including, the most recent CTA instrument response functions. We adopt an ON/OFF observation strategy and simulate the expected gamma-ray signals. Finally we compute the expected CTA sensitivity using a likelihood maximization analysis including the most recent CTA instrument response functions. In absence of signal, we show that CTA will allow us to provide stringent and competitive constraints on TeV DM, especially for the case of DM decay.