

Design of a 7m Davies-Cotton Cherenkov telescope mount for the high energy section of the Cherenkov Telescope Array

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Abstract The Cherenkov Telescope Array is the next generation ground-based observatory for the study of very-high-energy gamma-rays. It will provide an order of magnitude more sensitivity and greater angular resolution than present systems as well as an increased energy range (20 GeV to 300 TeV). For the high energy portion of this range, a relatively large area has to be covered by the array. For this, the construction of ~ 7 m diameter Cherenkov telescopes is an option under study. We have proposed an innovative design of a Davies-Cotton mount for such a telescope, within Cherenkov Telescope Array specifications, and evaluated its mechanical and optical performance. The mount is a reticulated-type structure with steel tubes and tensioned wires, designed in three main parts to be assembled on site. In this work we show the structural characteristics of the mount and the optical aberrations at the focal plane for three options of mirror facet size caused by mount deformations due to wind and gravity.

Keywords CTA · Gamma-rays · Imaging atmospheric Cherenkov telescope · Telescope optics · Telescope aberrations · Telescope mechanical mount

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