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TeV emission from unstable cosmic-ray nuclei in Centaurus A

Centaurus (Cen) A is the closest active galaxy, and evidence suggests it may be a local source of ultra-high-energy cosmic rays. The spectrum of Cen A from radio up to the GeV regime is well explained by electrons accelerated in the jet core. However, recent observations by the H.E.S.S. telescopes have revealed TeV gamma-ray emission from a region extending over a kiloparsec down the jet, suggesting a different emission mechanism. In this talk I will discuss the scenario where cosmic-ray nuclei heavier than protons are co-accelerated in the core of the Cen A jet. Using a novel numerical model, we simulate all nuclear and electromagnetic interactions, including photon emission from electromagnetic cascades and nuclear decay. I will show that some unstable cosmic-ray isotopes will escape the core region, subsequently decay further down the jet, and thus emit a TeV signal consistent with H.E.S.S. observations.

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