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Studies of a possible large-scale anisotropy of UHECRs with future orbital detectors

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We study capabilities of future orbital detectors of ultra-high-energy cosmic rays (UHECRs) like KLYPVE (K-EUSO) and POEMMA to reveal a large-scale anisotropy of their arrival directions at energies beyond ~50 EeV assuming a nearby active galactic nucleus provides a noticeable fraction of the total flux. We find that such a detector with a uniform exposure of the whole celestial sphere will be able to reveal an anisotropy at high confidence level providing it registers ~300 or more UHECRs and the fraction of the flux coming from a nearby source is of the order of 10%. We also demonstrate that such an anisotropy does not manifest itself clearly at energies above ~8 EeV, contrary to the dipole anisotropy found recently by the Pierre Auger Observatory, so that it can escape from being found by the existing ground-based experiments.

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