

UHECR arrival directions in the latest data from the original Auger and TA surface detectors and nearby galaxies

Executive Summary

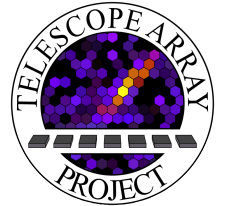


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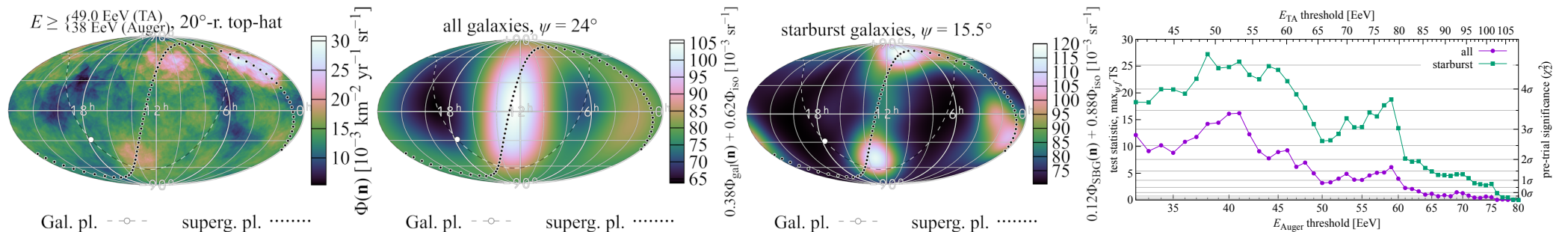


What is this contribution about?

A search for medium-scale anisotropies in the distribution of UHECR arrival directions detected using the Pierre Auger Observatory and Telescope Array surface detector arrays

Why is it relevant/interesting?

The origins of UHECRs is still not known, but at the highest energies they are not expected to be able to freely travel for cosmological distances, so their sources must be in nearby galaxies and we would like to eventually identify them. Several hints have already been reported (Pierre Auger coll., *ApJL* **853** (2018) L29; Telescope Array coll., *ApJ* **899** (2020) 86).



What has been done?

We searched for correlations with a catalog of galaxies of all types ($1 \text{ Mpc} \leq D < 250 \text{ Mpc}$) and one of starburst galaxies ($1 \text{ Mpc} \leq D < 130 \text{ Mpc}$) using a log-likelihood-ratio test.

What is the result?

Correlation with starburst galaxies ($\psi = 15.5^{+5.3}_{-3.2}^\circ$ scale, $f = 11.8^{+5.0}_{-3.1}\%$ signal fraction; 4.2σ post-trial significance) and with all galaxies ($\psi = 24^{+13}_{-8}^\circ$, $f = 38^{+28}_{-14}\%$; 2.9σ post-trial)