

# ON THE POSSIBLE GALACTIC SOURCES OF THE ULTRA-HIGH ENERGY COSMIC RAY ANISOTROPY AT 1EEV

G. A. Medina-Tanco (1) and A. A. Watson (2)

(1) Instituto Astronomico e Geofisico, USP, Brazil, (2) Dept. of Physics and Astronomy, Univ. of Leeds, UK.

`gustavo@iagusp.usp.br`

There have been many attempts to look for anisotropies in the arrival directions of cosmic rays in the expectation that the source of the particles might be revealed directly. Such prospects are more realistic when the energies of the particles are such that their Larmor radii are comparable to the thickness of the galactic disk. Recently, the AGASA group reported the analysis of a total of 216,000 showers above  $10^{17}$  eV observed over 15 years. They discovered a first harmonic signature in right ascension of amplitude  $\sim 4\%$  around 1 EeV. Remarkably, this is confirmed in two independent data set of 18274 and 10933 events between 1 and 2 EeV respectively. This corresponds to a  $4.5\sigma$  excesses of events from directions close to the galactic center. The AGASA array is sited too far north to cover the galactic center itself; however, the Sydney array, located at latitude 30.5 S has also claimed recently a point like excess region at  $(\alpha, \delta) = (274, -22)$ , i.e., close to (but not at) the Galactic center in the energy range  $10^{17.9}$  to  $10^{18.5}$  eV. In this paper we discuss these data and discuss possible interpretations of them. In particular we explore the possibility that protons accelerated to a high energy ( $\sim 1$  EeV) in some source(s) create high-energy neutrons via photopion production. We find that some of the characteristics of the experimental data can be explained under this hypothesis. Based on numerical simulations of particle propagation, we also set constraints to the location of a potential Galactic source.