

Universidade de São Paulo  
Instituto de Física de São Carlos

XIV Semana Integrada do Instituto de  
Física de São Carlos

Livro de Resumos da Pós-Graduação

São Carlos  
2024

Ficha catalográfica elaborada pelo Serviço de Informação do IFSC

Semana Integrada do Instituto de Física de São Carlos  
(13: 21-25 ago.: 2023: São Carlos, SP.)

Livro de resumos da XIII Semana Integrada do Instituto de  
Física de São Carlos – Universidade de São Paulo / Organizado  
por Adonai Hilário da Silva [et al.]. São Carlos: IFSC, 2023.  
358p.

Texto em português.

1.Física. I. Silva, Adonai Hilário da, org. II. Título.

ISSN: 2965-7679

139

## Signatures of ultra-high energy cosmic ray sources in large-scale anisotropy measurements

COSTA, Victor Bastos Canut<sup>1</sup>; PEIXOTO, Carlos José Todero<sup>1</sup>

victor\_b.c.c@usp.br

<sup>1</sup>Instituto de Física de São Carlos - USP

In the study of cosmic rays in particle physics, one of the most interesting class of this object are ultra-high energy cosmic rays, originated from outer space with energies that surpasses 1 EeV ( $10^{18}$  V) and composed by protons and heavier nuclei. However, even with their high energy, the identification of their detection is hindered by factors such as cosmic magnetic fields, which deflect the charged particles. But even if those ultra-high energy cosmic rays suffer deflection that deviates then from a straight path from their acceleration site, we can still extract hints of their origin with their distribution of arrival directions. One such example is the measurement by the Pierre Auger Observatory of a dipolar modulation in large scales anisotropies in the background, without the influence of our galaxy center. The aim of this work is to develop even further the understanding about the impact of astrophysical hypotheses in modeling the amplitude of the dipole measures by Pierre Auger Observatory. In this work, based on the work of Luciana Andrade Dourado in her thesis "Signatures of ultra-high energy cosmic ray sources in large-scale anisotropy measurements"(1), I will present some results with a cut in the energy of local magnetic fields while also trying to unite these results with the semi-analytical model used to analyze the magnetic fields in the background, elaborated by Rodrigo Guedes Lang in his work "Revisiting the distance to the nearest UHECR source: Effects of extra-galactic magnetic fields"(2). With the boundary between local magnetic fields and background magnetic fields determined, we can measure the anisotropy and compare it with the results of the Pierre Auger Observatory.

**Palavras-chave:** Large-scale anisotropy measurements; Pierre Auger Observatory; Ultra-high energy cosmic rays

**Agência de fomento:** Sem auxílio

### Referências:

1 DOURADO, L. A. **Signatures of ultra-high energy cosmic ray sources in large-scale anisotropy measurements**. 2023. 93p. Dissertação (Mestrado em Ciências) - Instituto de Física de São Carlos, Universidade de São Paulo, São Carlos, 2023. DOI: 10.11606/D.76.2023.tde-02012024-092909.

2 LANG, R. G. *et al.* Revisiting the distance to the nearest ultrahigh energy cosmic ray source: Effects of extragalactic magnetic fields. **Physical Review D**, v. 102, n. 6, p. 063012, 2020.