Universidade de São Paulo
Instituto de Física de São Carlos

Semana Integrada do Instituto de Física de São Carlos

13ª edição

Livro de Resumos

São Carlos
2023

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

PG94

Radiative model reconstruction of the Galactic Center central gamma-ray source

VIANA, Aion da Escóssia Melo[1]; MOMESSO, Daniel Cecchin[1]

daniel.cecchin@usp.br

[1]Instituto de Física de São Carlos – USP

Among all the high-energy environments of our Galaxy, the Galactic Center region is definitely the richest with HESS J1745-290 being its brightest source of γ-rays. (1) However, its origin is still unknown, and it may be related to accretion in the central black hole (Sgr A *), a wind from prolonged pulsars, or another type of source. This work aims to investigate whether the central source of γ-rays would be linked to cosmic particle accelerators, discovered in this region, capable of accelerating particles to PeV energies, called Pevatron. In this scenario, the stochastic acceleration of protons (up to PeV energies) interacting with the turbulent magnetic field in the vicinity of Sgr A*.could produce an escape flow of relativistic protons that diffuse outwards interacting with the molecular clouds that surround this region producing the observed γ-ray. (2) To explore this hypothesis, the morphology of the molecular clouds inside the central 10pc Sgr A* were modeled, as well as the production of γ-rays from the decay of π^0 that are produced through the proton-proton interaction of cosmic rays, which in the diffusion process collide with these clouds. With the elaboration of a computational code, the flux of γ-rays was calculated in two different scenarios, from a source of impulsive and continuous injection cosmic rays, and in each case a 2D image of these flows was made, obtaining different morphologies for each scenario. In the next, we will simulate the observed morphology of these two scenarios by convolving them a γ-ray telescope , such as CTA, instrument response function. We hope to be possible to infer if CTA will be able to differentiate which of the γ-ray emissivity scenarios is occurring in this region.

Palavras-chave: Astrofísica de altas energias. Raios cósmicos. Centro galáctico.

Agência de fomento: FAPESP (2022/04510-2)

Referências:

1 LONGAIR, M. S. **High energy astrophysics**. 3. ed. New York: Cambridge University Press, 2011.

2 FERRIÈRE, K. Interstellar gas within 10 pc of Sagittarius A*. **Astronomy and Astrophysics**, v. 540, p. A50-1-A50-21, Apr. 2012. DOI: 10.1051/0004-6361/201117181.