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

49

Dark matter spike and gamma-ray boost around the black hole at the galactic center

SILVA, Murillo Gregorio Grefener da[1]; VIANA, Aion da Escossia Melo[1]

murilloggsilva@usp.br

[1]Instituto de Física de São Carlos - USP

Presently, it is widely accepted that the predominant component of the Universe's matter density is an enigmatic constituent referred to as Dark Matter (DM), believed to consist of a neutral, stable particle, non-baryonic in nature. (1) In dense regions of the Universe, DM may undergo self-annihilation or decay processes, producing distinctive gamma-ray signatures. Particularly, dwarf galaxies, galaxy clusters, and the Galactic Center (GC) are compelling candidates for hosting substantial high-energy gamma-ray signals. The adiabatic growth of a black hole at the center of some of these objects can lead to a significant increase in DM density near the hole, consequently enhancing the expected gamma-ray flux. (2) Notably, the central region of the Milky Way harbors a supermassive black hole (SMBH) known as Sagittarius (Sgr) A *and an observable gamma-ray source named HESSJ1745-290, whose position is consistent with the SMBH. (3) In this study we performed a statistical fit of parameters concerning the DM particle and its distribution in the Milky Way. We show that the formation of an adiabatic spike in the GC and the DM self-annihilation "boost"effect around Sgr A* cannot alone explain the observed gamma-ray source in this region, and discuss how the inclusion of background emission from other non-thermal radiative models can account for this emission.

Palavras-chave: Dark matter; Black hole; Gamma-rays.

Agência de fomento: CAPES (88887.939389/2024-00)

Referências:

1 PROFUMO, S. **An introduction to particle dark matter**. Singapura: World Scientific, 2017. 288 p.

2 GONDOLO, P.; SILK, J. Dark matter annihilation at the galactic center. **Physical Review Letters**, v. 83, n. 9, p. 1719, 1999.

3 GLICENSTEIN, J. F. *et al.* The HESS Galactic Center source and Galactic plane diffuse emission. *In:* ANNUAL MEETING OF THE FRENCH SOCIETY OF ASTRONOMY AND ASTROPHYSICS, 2006, Paris. **Proceedings** [...] Paris, 2006. p. 141.