

TITLE

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ABSTRACT

Keywords: keywords

1. INTRODUCTION

2. METHODOLOGY

We simulate 3D special relativistic hydrodynamics with passive CR injections from the GC using the GPU code GAMER-SR (Tseng et al. 2021).

$$\partial_t D + \partial_j (DU^j/\gamma) = 0, \quad (1a)$$

$$\partial_t M^i + \partial_j (M^i U^j/\gamma + p\delta^{ij}) = 0, \quad (1b)$$

$$\partial_t \tilde{E} + \partial_j [(\tilde{E} + p)U^j/\gamma] = 0, \quad (1c)$$

$$\partial_t (\gamma e_{\text{cr}}) + \partial_j (e_{\text{cr}} U^j) = -p_{\text{cr}} \left(\frac{\partial \gamma}{\partial t} + \frac{1}{c} \partial_j U^j \right), \quad (1d)$$

where the five conserved quantities of gas D , M^i , and \tilde{E} are the mass density, the momentum densities, and the

reduced energy density, respectively. γ and U^j is the temporal and spatial component of four-velocity of gas. p_{cr} and e_{cr} is the CR pressure and CR energy density. c is the speed of light, and δ^{ij} is the Kronecker delta notation.

2.1. Assumptions and Numerical Techniques

2.2. The Galactic Model

2.3. Jet injection

3. CONCLUSIONS

DATA AVAILABILITY

The data underlying this article are available in the article and in its online supplementary material.

REFERENCES

Tseng P.-H., Schive H.-Y., Chiueh T., 2021, [Monthly Notices of the Royal Astronomical Society](#), 504, 3298

APPENDIX