Anisotropy Evolution from galactic CR to extragalactic CR

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PART 01

Introduction

简介

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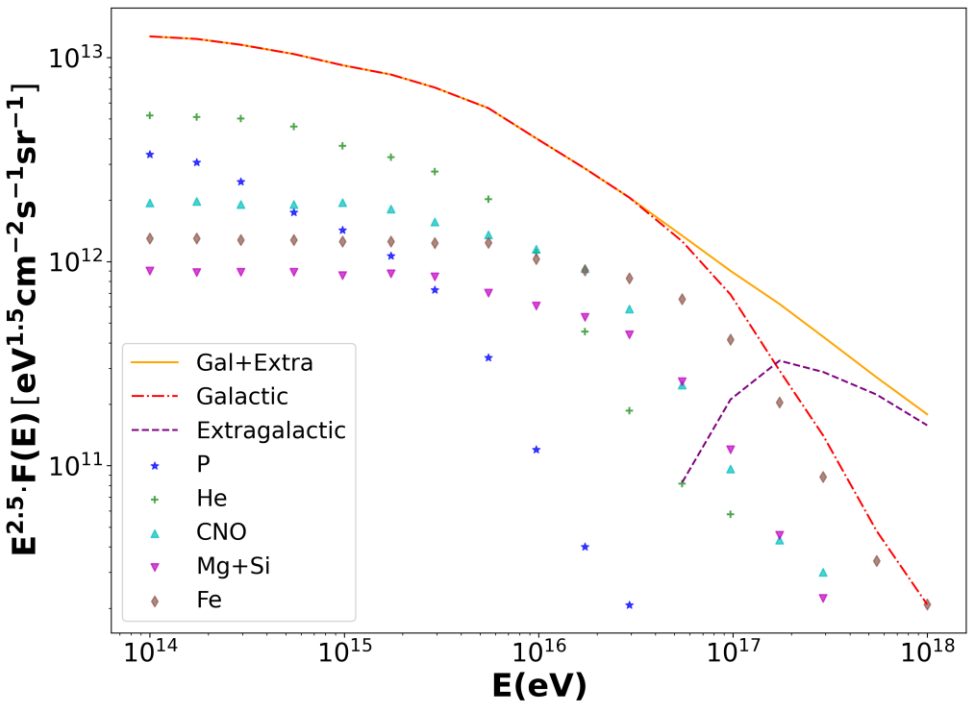
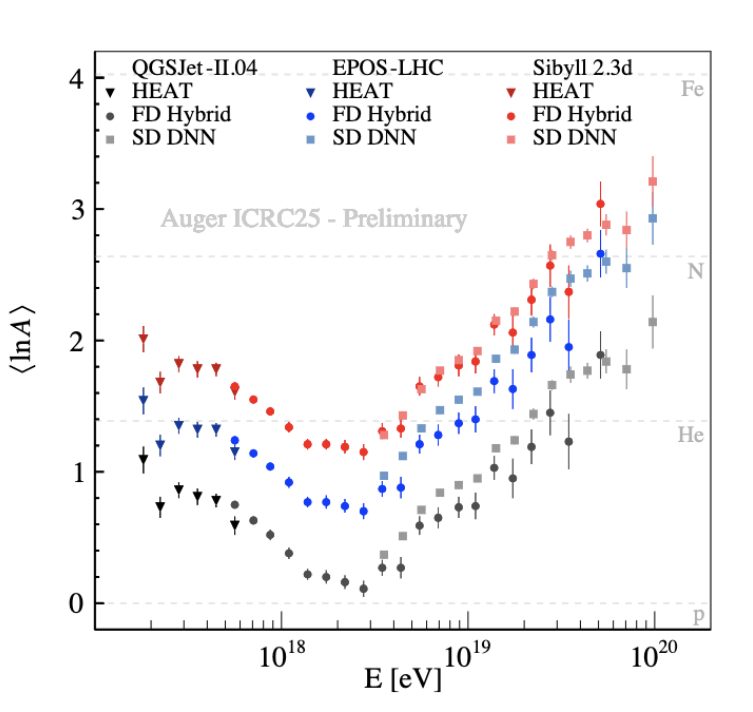
Motivation

The CR Spectra of the “knee”



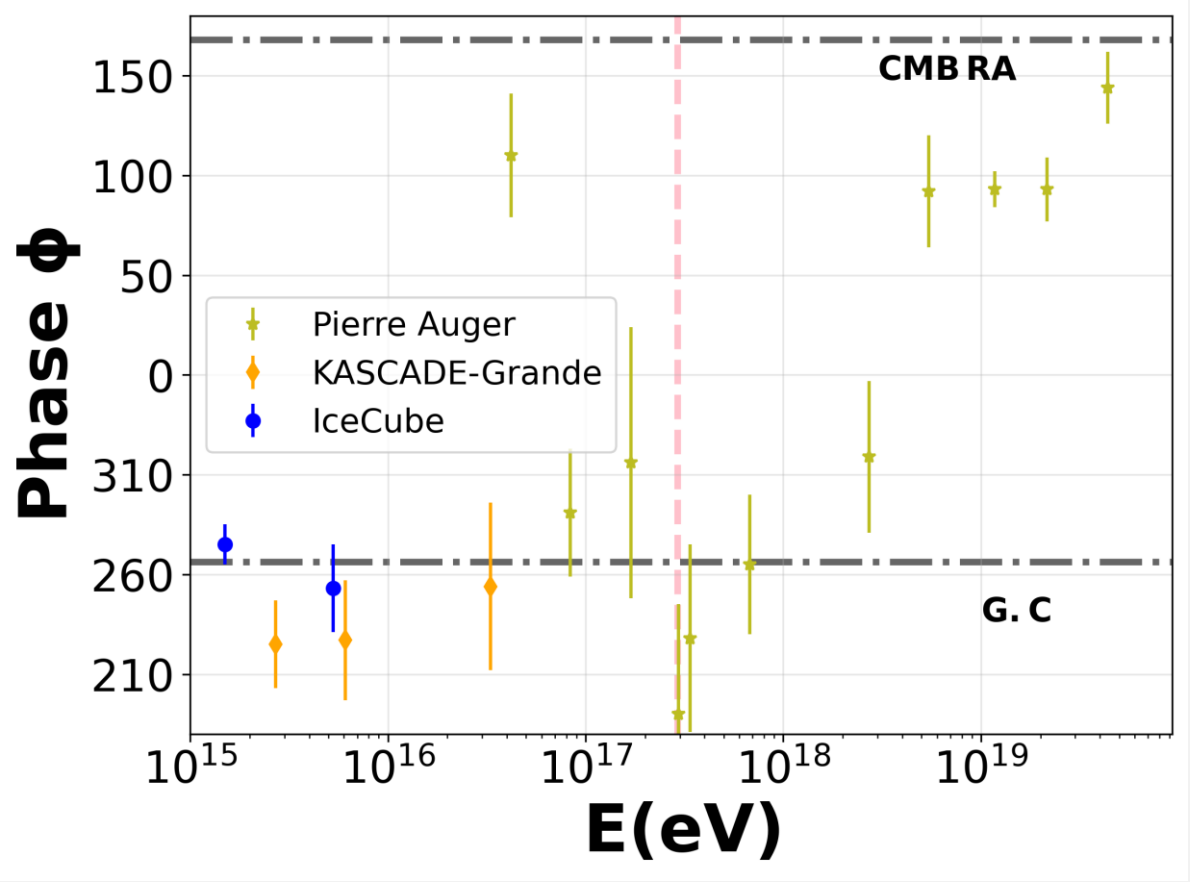
Giacinti, G., Kachelrieß, M., & Semikoz, D. 2015, Physical Review D, 91, 083009



Halim A A, Abreu P, Aglietta M, et al. Exploring the Ultra-High-Energy Universe: Highlights from the Pierre Auger Observatory[C]//39th International Cosmic Ray Conference. 2026: 1402.

Motivation

Anisotropy Dipole Transition



Wenyi B, Gwenael G （2026 In prep）

PART 02

Simulation Results

模拟结果

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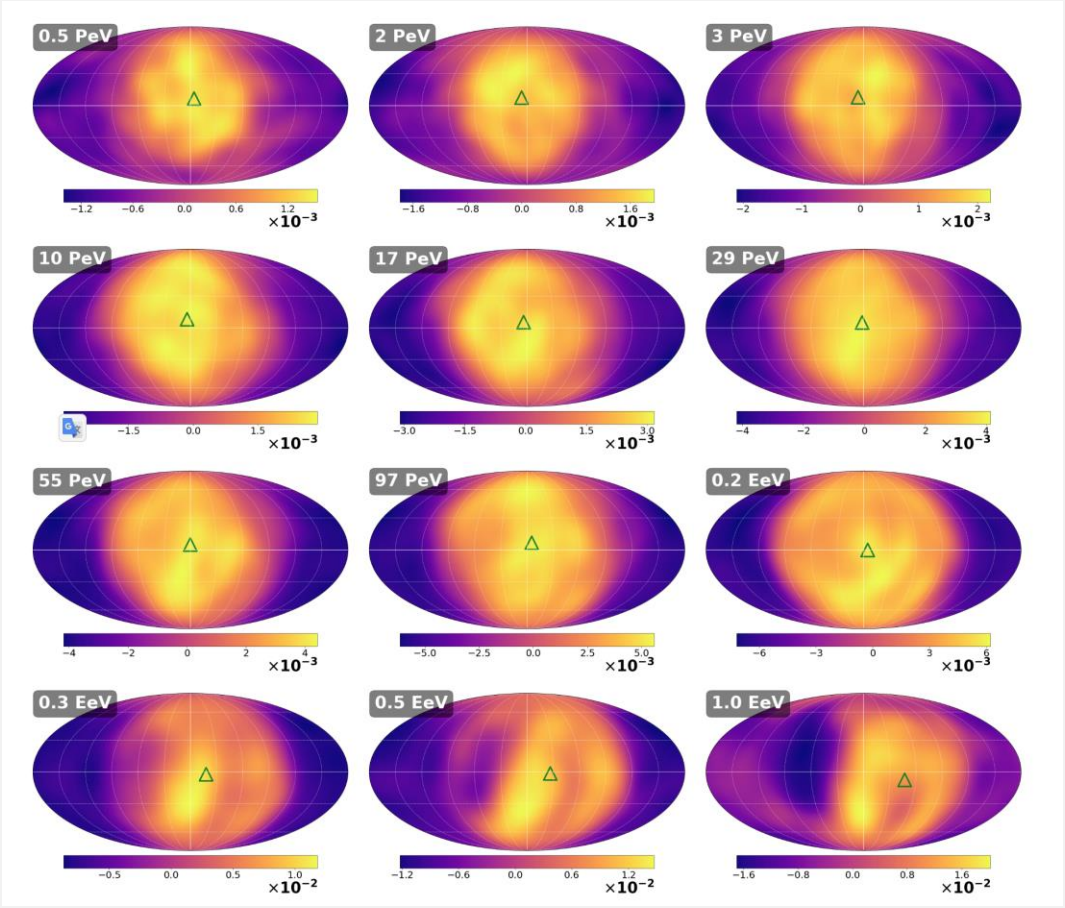
Results

Galactic CR Simulation Skymaps



Wenyi B, Gwenael G （2026 In prep）

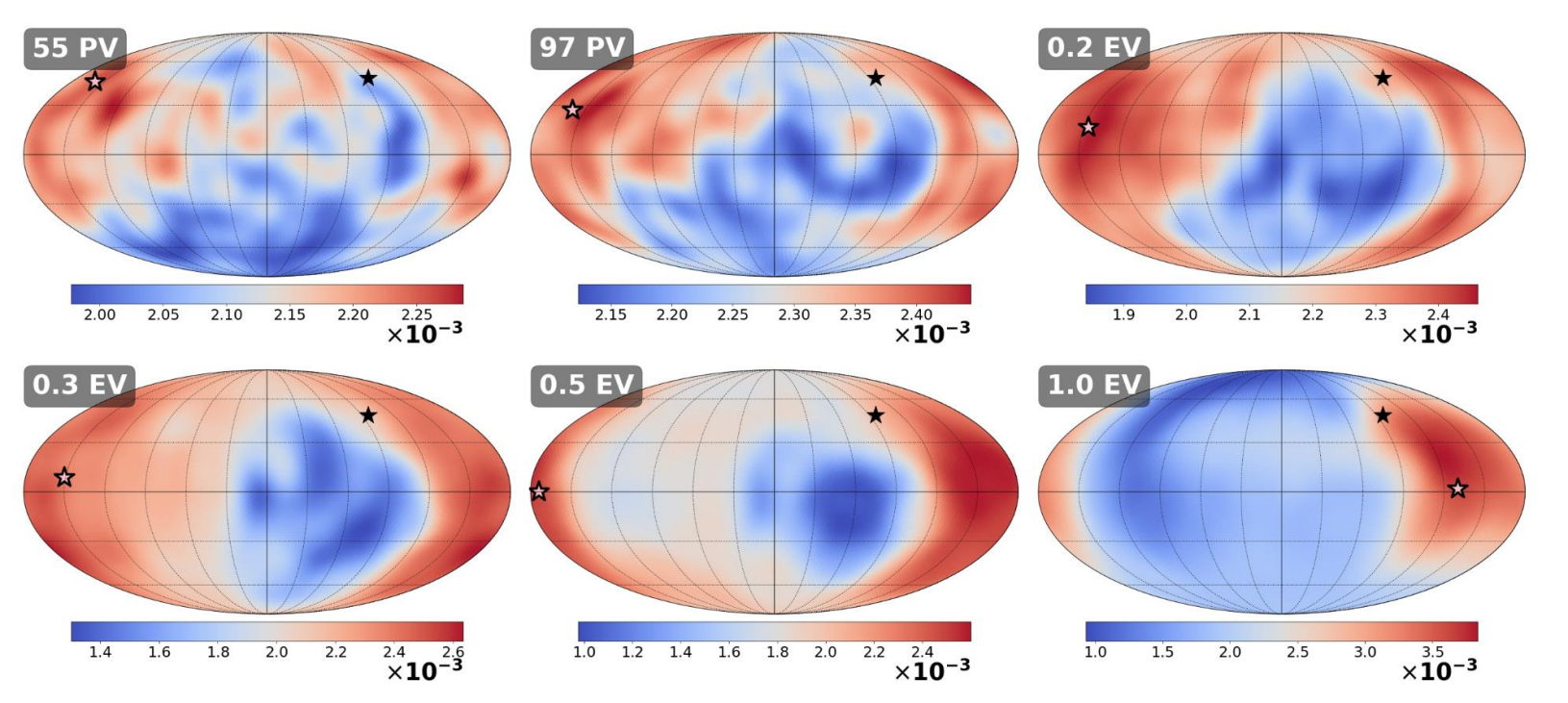
- **Backtracking all element particles**
- $k^{-5/3}$ $B_{rms} \sim 4uG$
- **CR density gradient towards GC**

3 PeV to around 100 PeV（Z*3 PeV）

- Dipole direction towards GC
- Morphologies of middle scale structures are similar

Results

Extra Galactic Skymaps



Wenyi B, Gwenael G (2026 In prep)

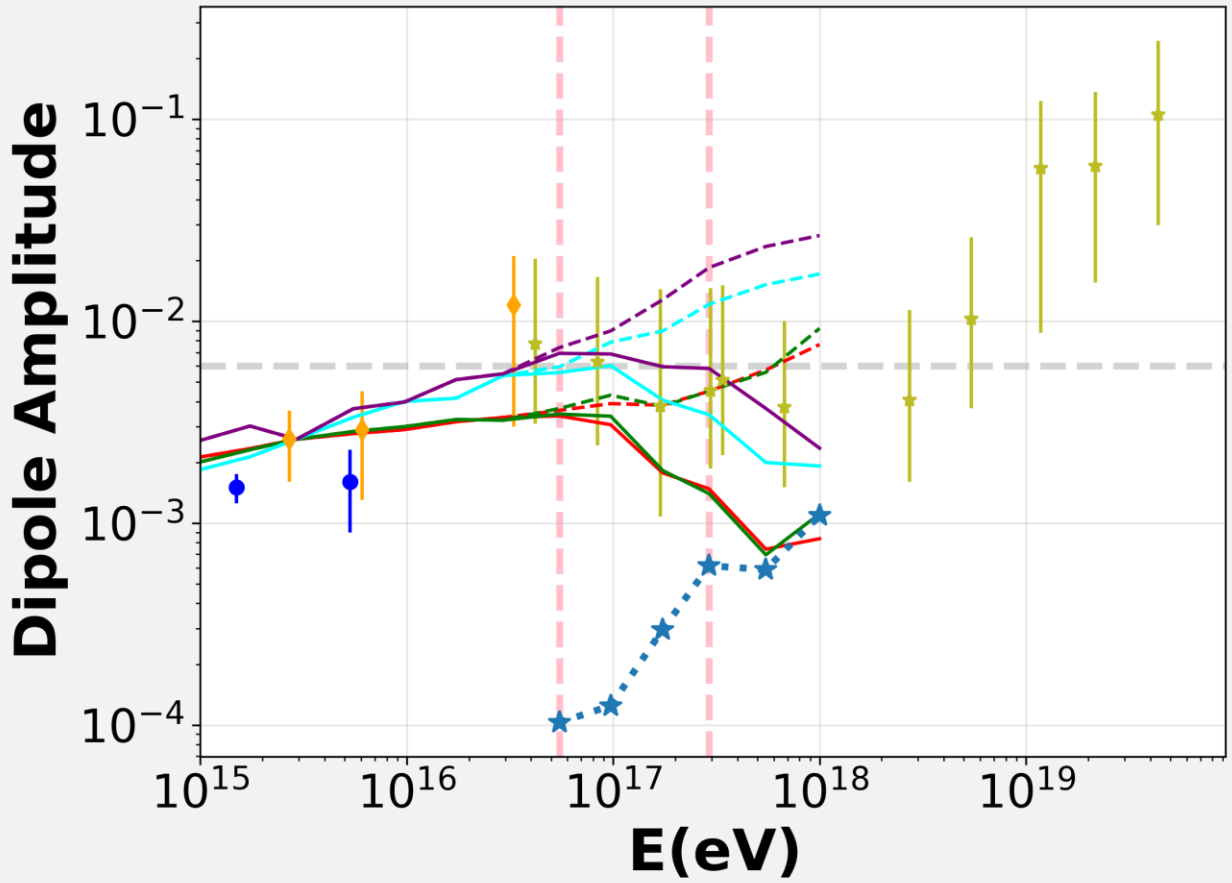
- **Backtracking EGCR outside the magnetic field halo**
- **JF12 model + turbulence**
- **0.6% level flux anisotropy as boundary condition from cosmological Compton-Getting effect**

Kachelriess, M., & Serpico, P. D. 2006, Physics Letters B, 640, 225

Jansson, R., & Farrar, G. R. 2012, The Astrophysical Journal, 757, 14

Results

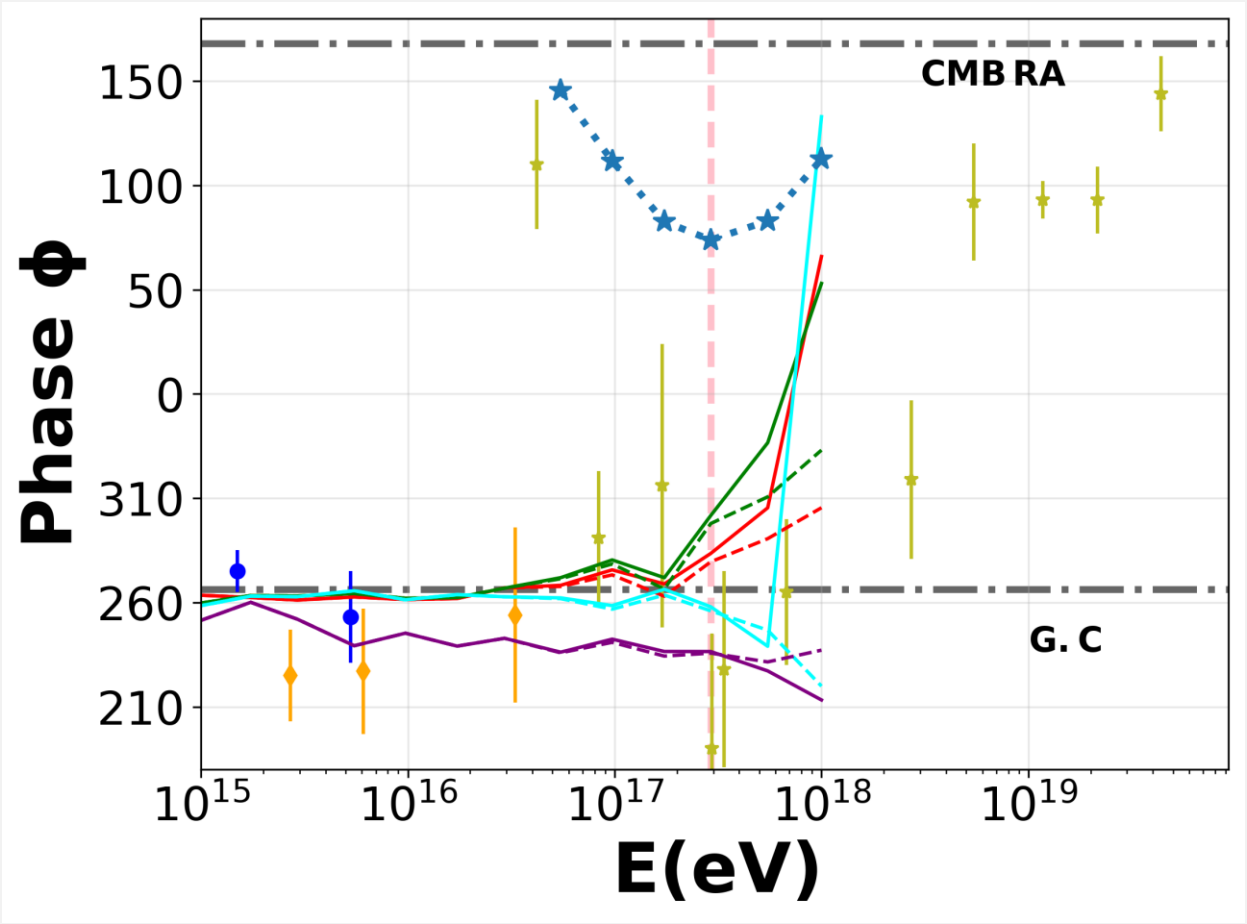
Anisotropy Dipole Evolution



- EGCR dipole amplitude reduced by GMF
- Total amplitude decreasing starting at the EGCR flux exsiting
- EGCR anisotropy dipole much smaller than GCR's

Results

Anisotropy Dipole Evolution



- **Under some configurations, the phase transition happens later**
- **See more details and calculations in poster**

谢 谢！