

SIMULATIONS OF THE COSMIC-RAY ANISOTROPY DOWN TO TeV ENERGIES

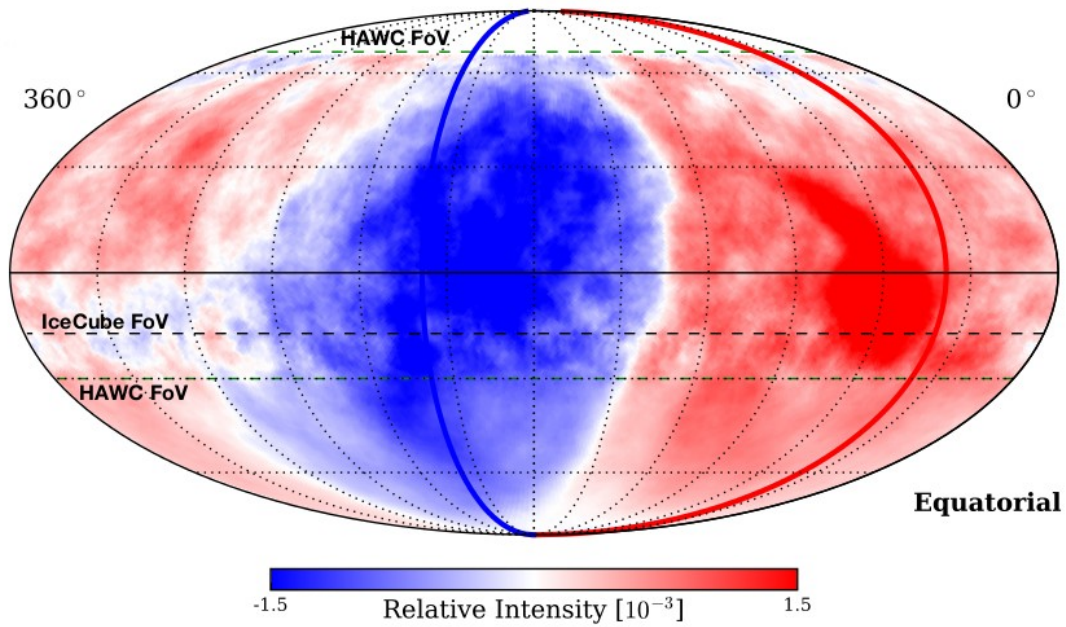
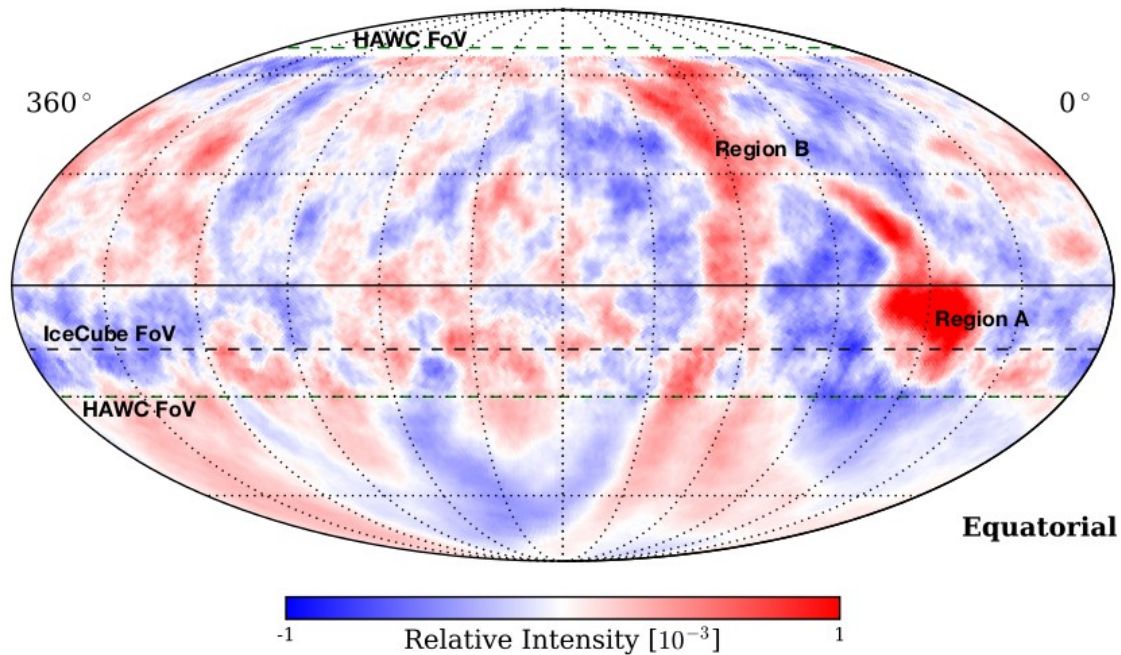
Gwenael Giacinti

**MPIK Heidelberg &
TDLI, SJTU, Shanghai**

上海交通大学物理与天文系 李政道研究所

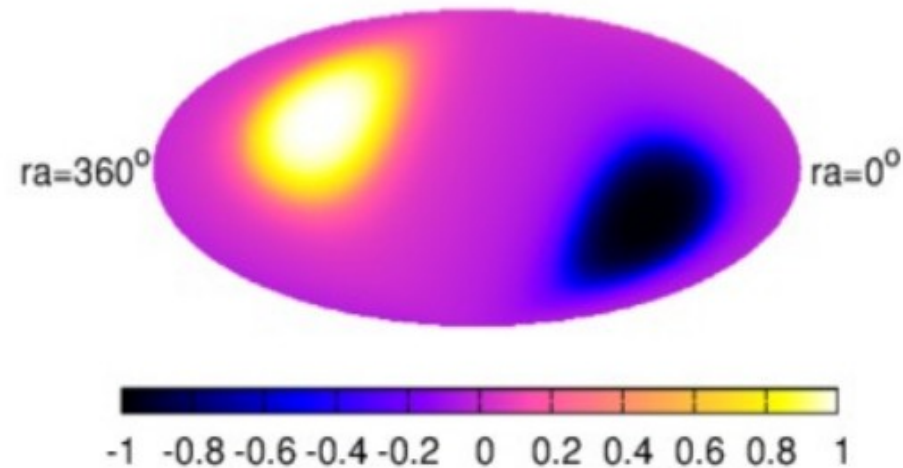
GG & Reville, In Prep. (2021)



LSA:**SSA ($l > 3$):**

Large-Scales:

Giacinti & Kirk, ApJ 835, 258 (2017)

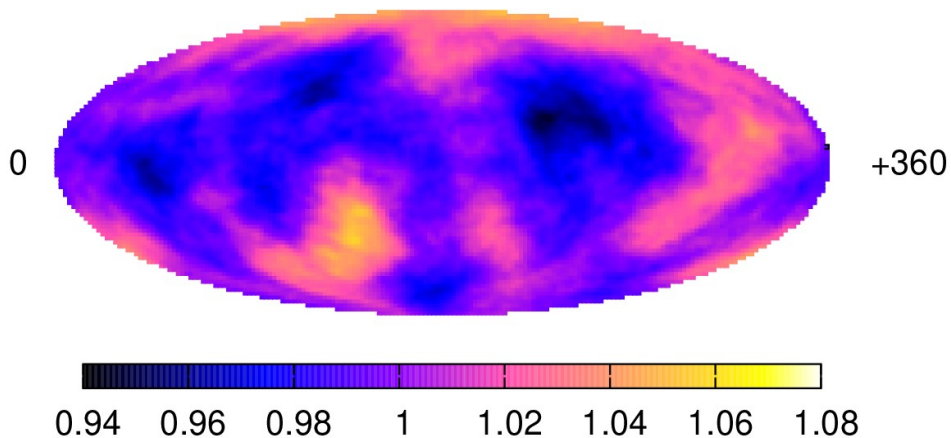


NOT a
dipole in
general !

Small-scales:

Giacinti & Sigl, Phys. Rev. Lett. (2012)

20°smoothing - {Dipole}



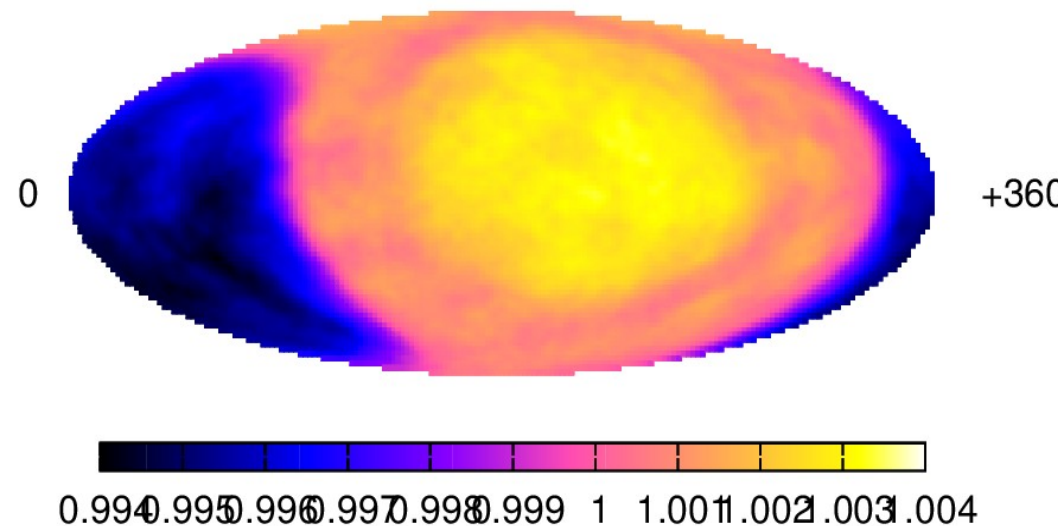
SSA due to the local
realization of the
turbulent field, within a
CR MFP from Earth.

Simulations down to 3 TeV

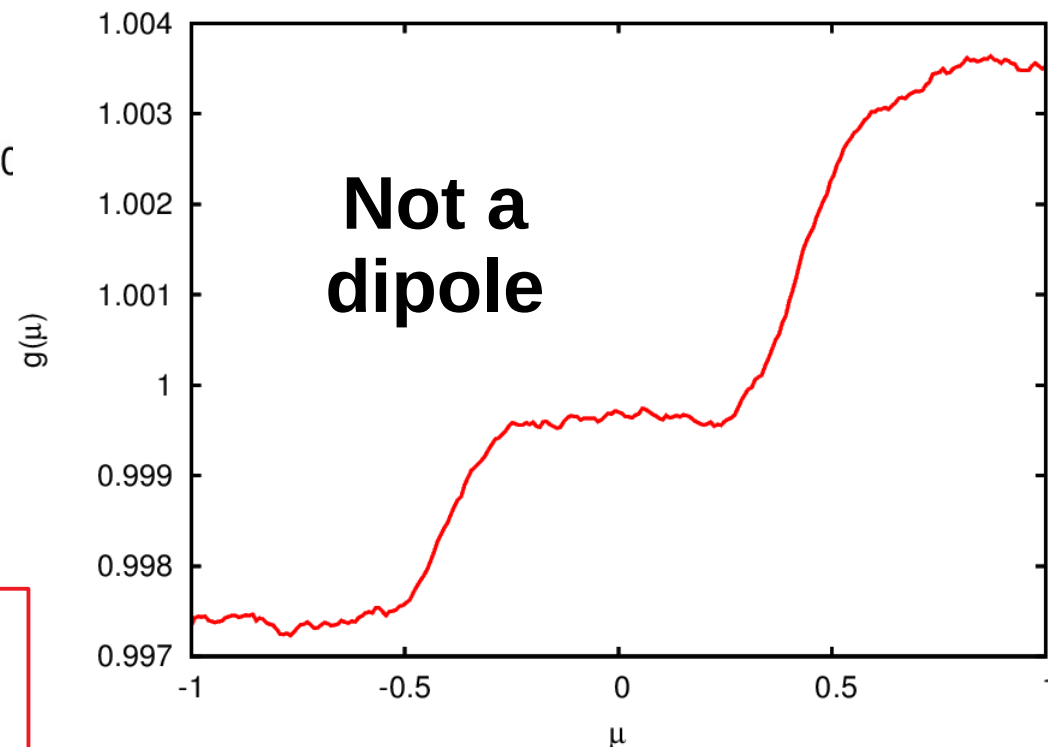
Giacinti & Reville, In prep. (2021)

First simulations that reach TeV energies with $L_{\text{max}} = 150 \text{ pc}$

Kolmogorov, $B_{\text{rms}} = 4 \mu\text{G}$



Shape of the large-scale anisotropy:



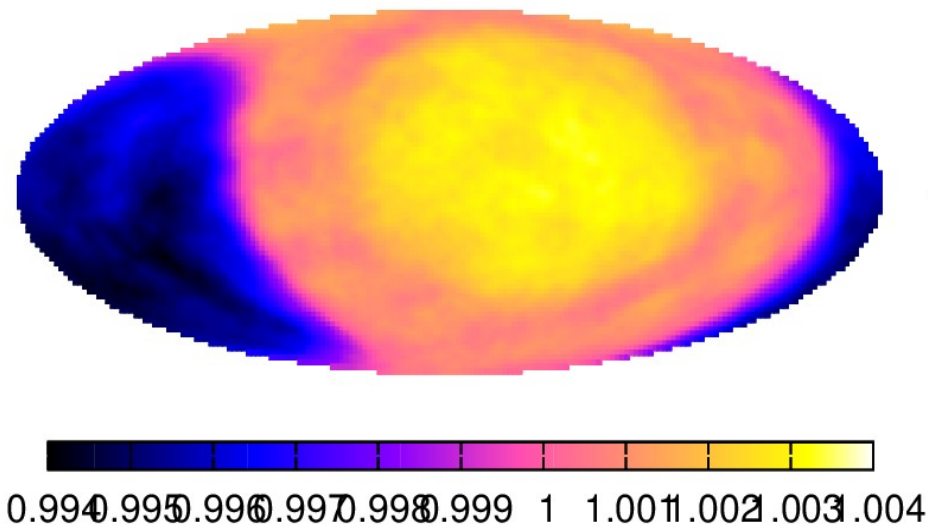
- LSA aligns with the direction of local magnetic field lines,
- LSA **not a dipole.**

Simulations down to 3 TeV

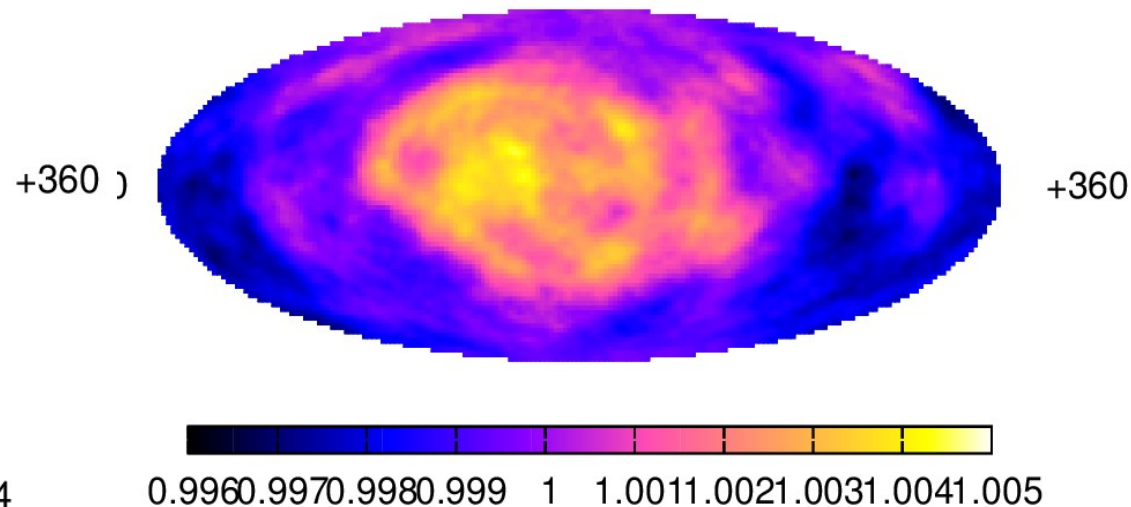
Giacinti & Reville, In prep. (2021)

First simulations that reach TeV energies with $L_{\text{max}} = 150 \text{ pc}$

Observer 1 (Low $\delta B/B$):



Observer 2 (High $\delta B/B$):



- “Non-gyrotropic”, smaller-scale anisotropies appear too,
- Ampl. SSA/LSA related to local $\delta B/B$ on gyroresonant scales.