

Future plans: Astroparticle Physics IGFAE group

Auger has significantly advanced our understanding of Ultra-High Energy Cosmic Rays:

- ✓ Dipole anisotropy observed by the first time
- ✓ Muon excess observed not explained by hadronic models
- ✓ Insights about composition at the highest energies
- ✓ Very accurate spectrum measured including the flux suppression at the highest energies
- ✓ Proton-air cross section measured at the highest energies ever
- ✓ Best neutrino limits ...

With strong scientific contribution of IGFAE-Astro group

But key questions stay to be answered: origin of flux suppression at highest energies, pin-down sources, UHE proton astronomy, hadronic physics, UHE ν 's

Future in the short – mid term

- ❑ Continue participation in the Pierre Auger Observatory
- ❑ Exploit **AugerPrime** data to further address these open questions
 - construction ends in 2019, data taking 2018 - 2025

Answers to these questions will determine the prospects of the future UHECR & UHE ν detectors: Cannot foresee how the field of UHECR & UHE ν physics will evolve in the forthcoming years

Future in the mid – long term

- ❑ Exploit expertise of IGFAE-Astro group on **radio detection of UHE particles**: data to further address these open questions:
 - Many experimental initiatives in the planning stage
 - First scientific contributions from IGFAE-Astro to some of them: SKA, GRAND
- ❑ New opportunities are emerging in the field of Astroparticle Physics:
 - Multi-messenger Astronomy (gamma rays, neutrinos...)