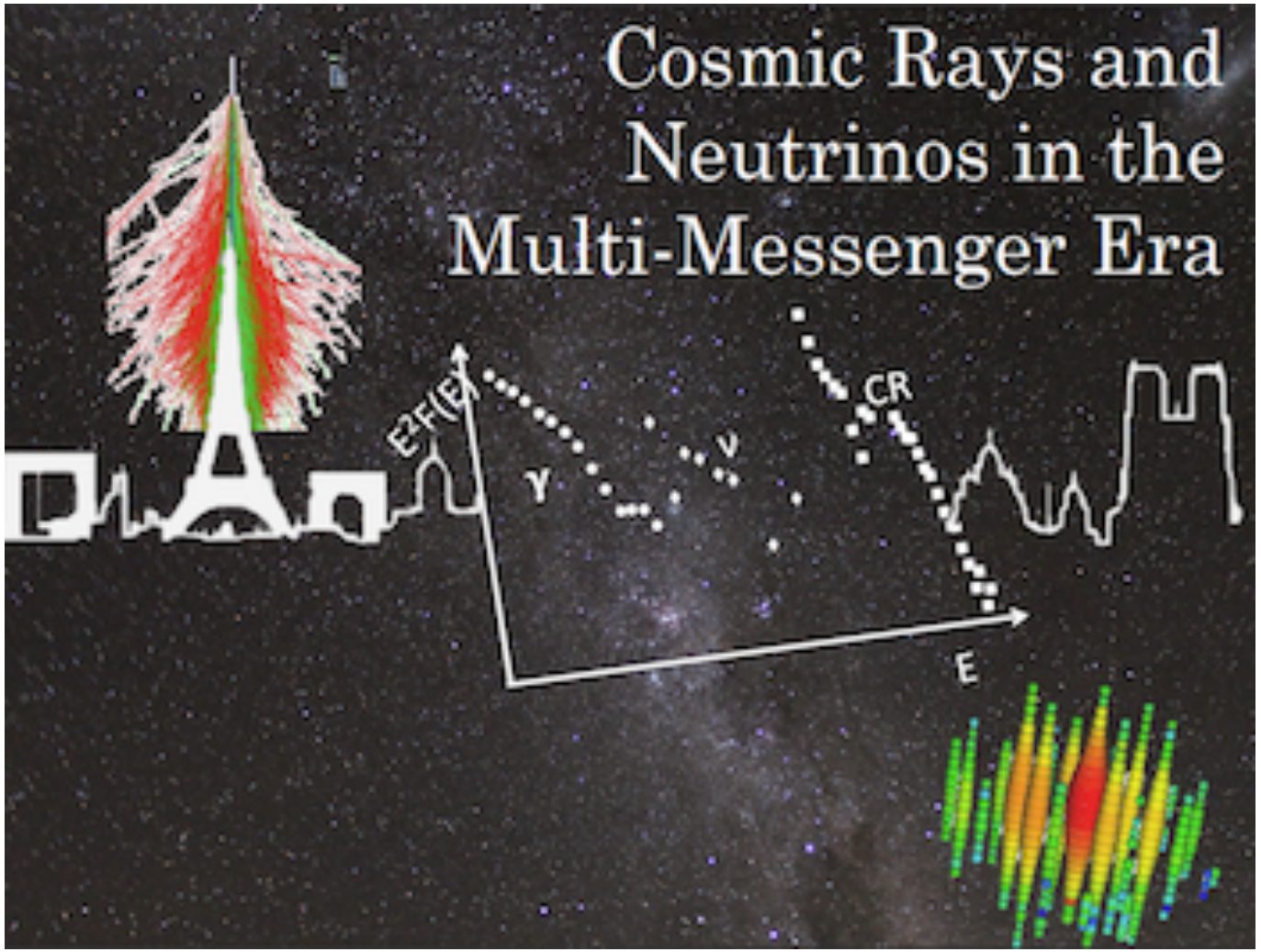


7-11 décembre 2020

https://indico.in2p3.fr/event/20789/

Lots of discussion on radio-selected blazars as neutrino sources

Alexander Plavin (ASC LPI and MIPT, Moscow)
Yuri Y. Kovalev, Yuri A. Kovalev, Sergey Troitsky

Summary

Plavin, Kovalev, Kovalev, Troitsky
Jan 2020: *ApJ, 894, 101*
Sep 2020: https://arxiv.org/abs/2009.08914

Neutrinos from TeV to PeV are produced in central parsecs of bright blazars

Significance 4.1σ, p = 4×10^{-5}

- At least 70 blazars are associtated with IceCube neutrino tracks
- VLBI is key to this association
- Essential to account for systematic positional errors: our estimate is ≃ 0.5°

- Radio blazars can explain all astrophysical neutrinos of these energies
- They emit neutrinos along the jet direction
- Strong constrains on the astrophysical conditions: photons to 100 keV, protons to 10^{16} eV

Ongoing and future studies:

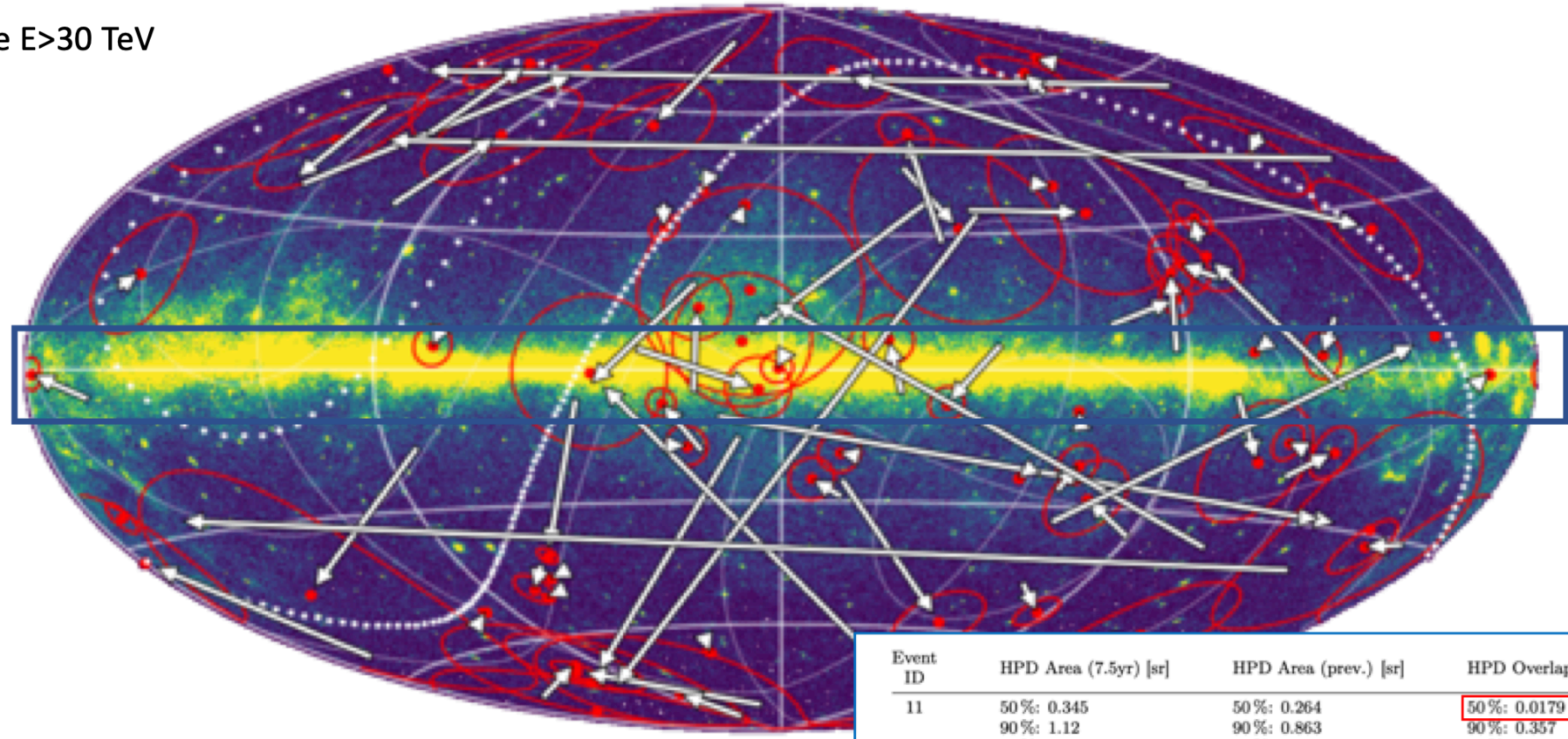
- Independent confirmations: temporal correlation with flares detected in *Hovatta et al., 2020*
- More neutrino detections with better precision: IceCube, Baikal, ANTARES, ...
- Observing blazars specifically focused on those coinciding with neutrinos. 2 Dec 2020: triggered VLBA follow-up on IC 201130A

Lots of discussion as IceCube finally made the changed HESE samples public

Neutrino sky

Andrii Neronov
APC, Paris & University of Geneva

IceCube E>30 TeV
revised



Event ID	HPD Area (7.5yr) [sr]	HPD Area (prev.) [sr]	HPD Overlap Area [sr]
11	50 %: 0.345	50 %: 0.264	50 %: 0.0179
	90 %: 1.12	90 %: 0.863	90 %: 0.357
12	50 %: 0.0881	50 %: 0.0920	50 %: 0.0429
	90 %: 0.296	90 %: 0.304	90 %: 0.219
13	50 %: 0.0269	50 %: 1.36×10^{-3}	50 %: 0.00
	90 %: 0.0893	90 %: 4.51×10^{-3}	90 %: 0.00
14	50 %: 0.0445	50 %: 0.167	50 %: 0.0445
	90 %: 0.148	90 %: 0.547	90 %: 0.148
15	50 %: 0.219	50 %: 0.367	50 %: 0.0242
	90 %: 0.536	90 %: 1.19	90 %: 0.290
16	50 %: 0.787	50 %: 0.358	50 %: 0.109
		.....	

Re-analysis of ice properties has led to significant revision of IceCube HESE events. Positions shift by more than median error (which was already ~15°.
Sizes of error regions also have increased.

IceCube Collab. 2020