

iProgress working report

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Tunka-Rex type SALLA antenna at the Piere Auger Observatory

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Obtained results

the main goal of my study in the framework of iProgress grant was a preliminary analysis of the short aperiodic loaded loop antennas (SALLAs) [1, 2] recently installed at the site of the Piere Auger Observatory in Argentina. This type of antenna is used also in the Tunka Radio extension (Tunka-Rex) in Siberia there it is performing well with its very high durability and simplicity of structure [3]. The photos of both antennas are shown in Fig. 1.

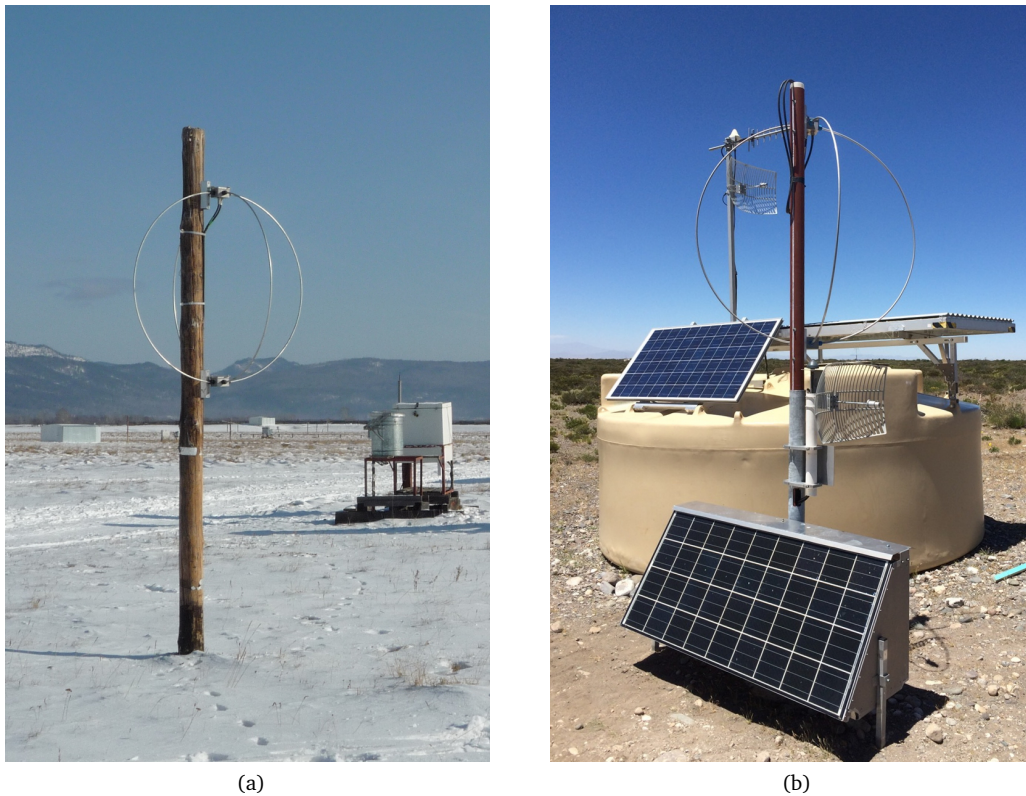


Figure 1: SALLAs at the Tunka site (a) and the Auger site (b).

One of the main checks for normal operation of an antenna operating normally is dynamic spectrum of received radiation by the antenna. For comparison the dynamic spectra of the SALLA and a log-periodic antenna (LPDA) were calculated for the same observation time at the Auger Engineering Array (AERA) (Fig. 2, 3).

One can see that both antenna types feature very similar variations of the spectrum. Since we know that this type of variation for the LPDA is due to the galactic plane passing through the main lobe of the antenna, we can preliminary conclude that the similar variation measured by the SALLA has most likely the same nature of Galactic noise. However, for a final conclusion about this effect and the antenna performance additional data analysis and studies are required. This study will be done as part of my doctoral research.

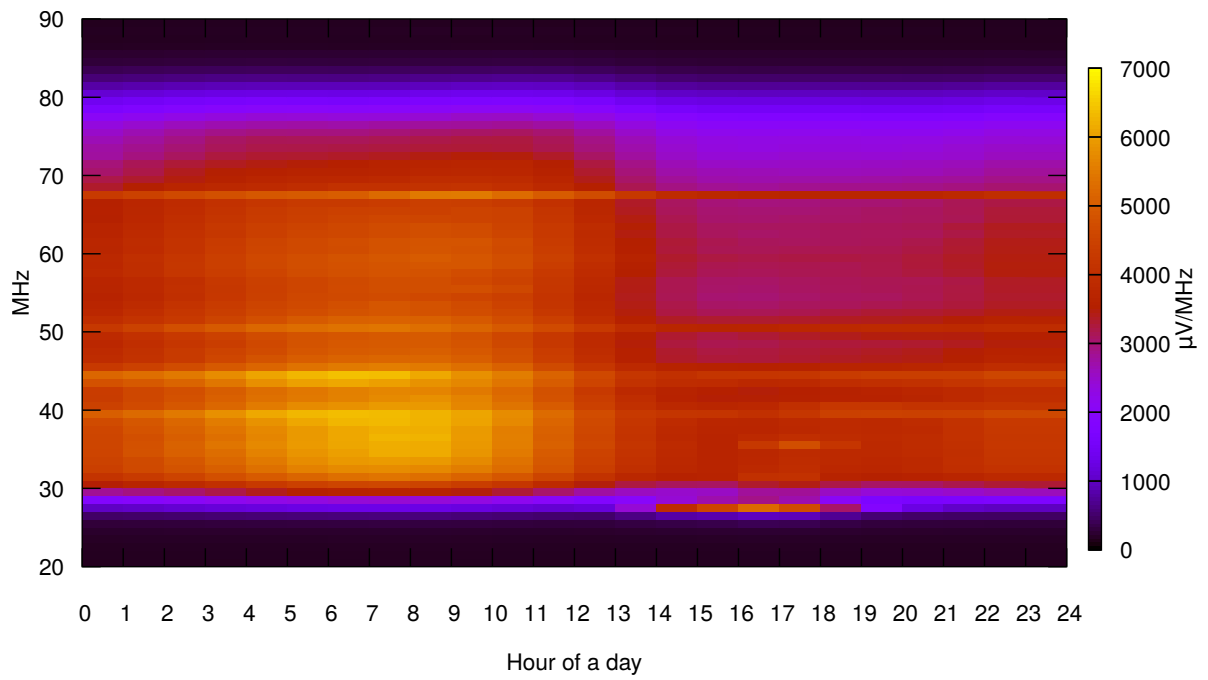


Figure 2: Dynamic spectrum of the SALLA on the Auger site. Station #181 for 26–27 April 2017.

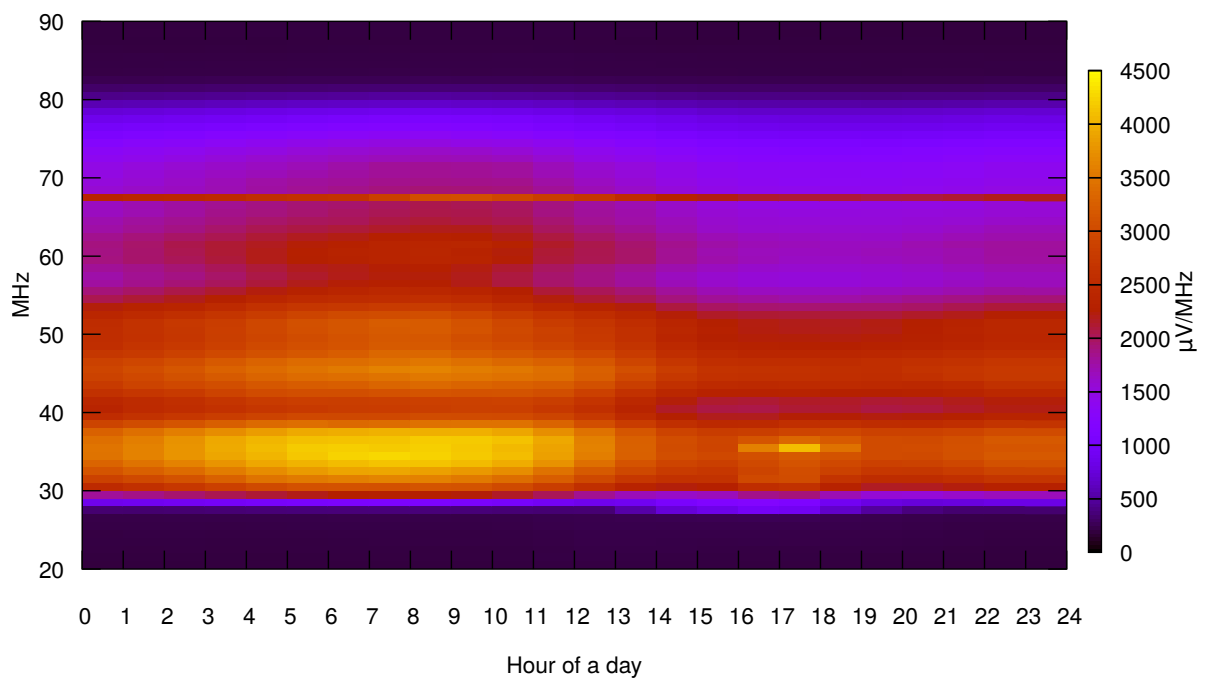


Figure 3: Dynamic spectrum of the LPDA on the Auger site. Station #101 for 26–27 April 2017.

Given talks

- Internal weekly IKP meeting

References

- [1] LOPES collaboration, H. Gemmeke, New antenna for radio detection of UHECR, in Proceedings of the 31st International Cosmic Ray Conference, Łódź, Poland
- [2] P. Abreu et al. 2012 JINST 7 P10011
- [3] P.A. Bezyazeekov et al. - Tunka-Rex Collaboration, Nucl. Instr. and Meth. A 802 (2015) 89-96, doi:10.1016/j.nima.2015.08.061