# Astronomers develop sky model to help ultralong-wavelength observations

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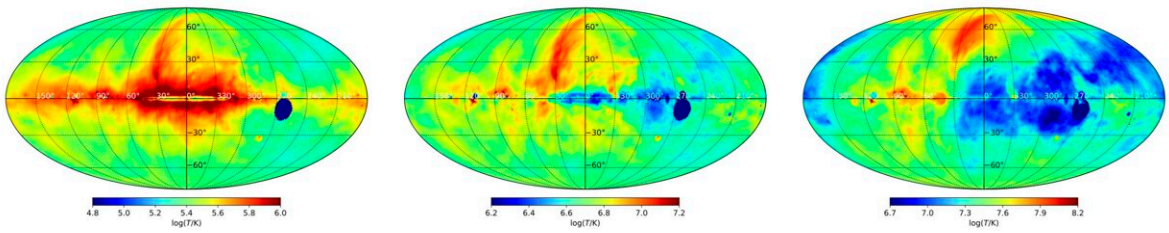

The predicted sky maps, from left to right, at 10, 3 and 1 MHz. Credit: Cong et al. 2021

The radio sky at frequencies below ~30 MHz, particularly below ~10 MHz, is still largely unknown. Due to the absorption and distortion by the ionosphere, it is quite difficult to receive radio signal of such ultra-long wavelength by telescopes on Earth.

Some future space projects have been proposed to map the ultra-long wavelength sky with unprecedented resolution, and help to study the astrophysics behind.

To prepare for these upcoming projects, scientists from the National Astronomical Observatories of the Chinese Academy of Sciences (NAOC) recently developed a radio sky model that can be applied to this

ultra-long wavelength band.

The study was published in *The Astrophysical Journal* on June 23.

Their sky map showed unique features at the ultralong wavelengths. They predicted the morphology of the radio sky down to ~1 MHz, which is very different from higher frequencies. For example, the high galactic latitude regions are brighter while the galactic plane is dark.

Moreover, one can see clearly the shadows of galactic spiral arms and the radio signal leaks from the gaps between arms. The model also provides interpretation for the observed global radio spectrum downturn at ~3-5 MHz.

The model (including the data and maps) can be accessed at https://github.com/Yanping-Cong/ULSA. The model has been used for designing instruments, developing imaging algorithm and optimizing survey strategy in the DSL project.

**More information:** Yanping Cong et al, An Ultralong-wavelength Sky Model with Absorption Effect, *The Astrophysical Journal* (2021). DOI: 10.3847/1538-4357/abf55c

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