



Update on the Mapper of the IGM Spin Temperature (MIST) Global 21-cm Experiment

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The Mapper of the IGM Spin Temperature (MIST) is a new radio experiment attempting to detect and ultimately measure with precision the sky-averaged, or global, redshifted 21-cm signal. This signal was emitted by neutral hydrogen during the Dark Ages, Cosmic Dawn, and the Epoch of Reionization, before and during the formation of the first stars, galaxies, and black holes in the Universe. Measuring this signal with high precision would enable us to characterize the physics of the first compact objects in the Universe. To attempt to measure the global 21-cm signal, MIST uses a single antenna and relies significantly on the lab calibration of its total-power radiometer, the determination of the antenna beam characteristics using electromagnetic simulations, and the electrical characterization of the soil at the observation site. Other key aspects of MIST include its very low power consumption (<20W) and its small size (all dimensions <1.5m). This makes MIST very flexible in a logistical sense and enables us to plan sky observations from several remote radio-quiet sites around the world, including the Canadian high Arctic and the Atacama desert in Chile. In this presentation I will introduce the MIST experiment and instrument, describe its design philosophy, and discuss in detail its status. I will focus on our recent efforts to achieve the highest accuracy possible in the lab calibration and the antenna simulations. I will then describe our current analysis of preliminary sky measurements conducted during a two-week observation campaign done in August 2021 at a remote site of Quebec. Before finalizing my presentation, I will describe the refinements to the instrument being conducted for the next field trip, implementing the lessons learned from the 2021 campaign.