Contribution ID: **51** Type: **not specified**

Monopole antenna for detecting the signal during Cosmic Dawn to Epoch of Reionization –Current status

Cosmic Dawn to Epoch of reioniztion is a period which began in the history of universe, with the formation of stars for the first time and ended in transforming completely the neutral state of hydrogen to ionized state. Thermal history of the universe during this era is currently poorly understood. The 21cm line of neutral hydrogen is considered as a power tool to probe this era to gain better understanding of it. Its intensity variation as a function of time is predicted to carry information about various physical processes responsible for either heating or ionizing the intergalactic medium. This signal could be detected by measuring the spectral distortion imprinted by the signal in the spectrum of the cosmic microwave background radiation over the frequency range of 50-200 MHz. The magnitude of these distortions is orders of magnitude weaker than the Galactic and Extragalactic foregrounds and hence measuring them in the presence of foregrounds is challenging.

Several factors of an antenna used for the detection often mask the desired signal. They either make the antenna insensitive to the signal or produce undesired features in its spectral response which would mimic the signal under detection. Reflection efficiency, radiation efficiency and spectral smoothness in impedance characteristics and radiation patterns are the three primary factors which predominantly govern the detection process. It is desired to have reflection efficiency better than 10%, radiation efficiency more than 50% and spectral smoothness at a few parts in a million over 1:4 band of 50-200 MHz. It is difficult to achieve these simultaneously over a large bandwidth because of their complex dependencies on i) physical dimensions of the antenna and ii) media around it. In this talk, I present the recent progress made by us in the antenna design, experiences in simulation and prototyping and the measurement results. Our work continues towards constructing a broadband antenna with all the desired features at metre wavelengths.