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Parametric simulation studies on the wave propagation of solar radio emission: the source size, duration, and position

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The solar atmosphere is fluctuated and highly refractive for low frequency waves (<300MHz), the observed features of solar radio sources have indicated the existence of complex propagation effects. The propagation effect has two major parts: refraction and scattering, these two parts have combined influence on the observed source size and position of radio imaging and temporal-frequency features in the radio spectroscopy.

We present a parametric simulation for the propagation effect of the radio wave from solar radio bursts, with the method of parametric simulation, we can build connections between the solar atmosphere plasma condition and the observed radio source properties. By comparing the simulation results with the observed source size and property we estimated the scattering rate and the degree of anisotropic of the background electron, and from the simulation results we propose a possible explanation for the co-spatial phenomena of the fundamental wave and harmonic wave in single frequency.