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GRAVITATIONAL LENSING OF SUN FOR DEEP SPACE COMMUNICATION

Abstract

Gravitational lens of the sun is a phenomenon predicted by General Theory of Relativity. The sun's mass will act as a huge magnifying lens, letting us see radio maps of whatever may lie on the other side of the sun by using a probe along any radial direction away from the sun up to the minimal distance of 550 AU and beyond. We could use the same phenomenon to enable the future interstellar radio links between the solar system and any interstellar probe by exploiting the gravitational lens of Sun as a huge antenna. Using the mass and gravity of sun, we can increase the gain of the signal and decrease its Bit Error rate for deep space missions and also maintain a high data rate. This paper aims to compare the bit error rate across interstellar distances with and without using the gravitational lens effect of the Sun and the possibility of building radio bridges across the solar system by placing transmitters at an effective focal distance from the sun such that data could be transmitted to the interstellar probes in the least time possible and using minimum power.