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Abstract:Based on the Marshall-Palmer, Weibull raindrop size distribution and Mie electromagnetic scattering model, the relationships of attenuation coefficient of terahertz (THz) atmospheric window waves with precipitation rate and temperature are studied. Furthermore, combined with the loss of electromagnetic wave transmission in free space, the attenuation of THz communication and the transmission of current mobile communication signals through rain are compared and analyzed. The results show that the attenuation coefficient of THz transmission is increased with increasing precipitation rate, the difference of attenuation coefficient at different THz window waves is small, and the maximum difference is about 3 dB. The rain attenuation of THz wave is first decreased and then increased with increasing temperature, but the temperature has little effect on it. The attenuation of THz wave through rain is much larger than that of mobile communication signal. © 2012 Tianjin University of Technology and Springer-Verlag Berlin Heidelberg.
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