Modeling the Interaction of Terahertz Radiation with Human Skin

Shaoxin Huang[1]

[1]Peking university

Abstract

This paper presents the modeling of interaction between terahertz radiation and human skin. By doing so, we can differentiate between the healthy skin and the cancerous skin (BCC). We set a square region as the cancerous skin, surrounded by the healthy skin. Since the biological tissues might comply with the Debye dispersive model, we set the materials of the two skin areas as Debye dispersive media. Then we added the physics Electromagnetic Waves, Frequency to the model. We set the Scattering Boundary Condition to simulate the reflection-free space. Furthermore, we set a parameter sweep to acquire the incident electric fields in the frequency domain with the frequency range from 0.2THz to 2THz. After computing, we got the reflected electric field off the skin sample, with which we imaged the sample. The image provides a clear contrast of the healthy skin and the cancerous skin. Our model could explain the interaction of terahertz radiation with biological tissue in a way. It might provide a considerable reference for future terahertz imaging on biomedical applications.