NON-BIOLOGICAL REFLECTIVE TERAHERTZ IMAGING

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Abstract
Terahertz radiation has shown unique and useful properties making it attractive in medical imaging. Due to its high sensitivity to water, THz imaging can be used in diagnosis of burn injuries, skin cancer, and corneal hydration. In this study, we used a line pair phantom to characterize the signal and spatial resolution of a reflective THz imaging system operating at 0.5 THz. The line-pair phantom determined the spatial resolution of the imaging modality by returning signals from differently spaced, alternating reflective and non-reflective surfaces. The high sensitivity of THz to water lends itself to the diagnosis of burn injuries, skin cancer, and corneal hydration studies. In this study, we used a novel, reflective THz imaging system that operates at 0.5 THz center cycling frequency to characterize its signal and spatial resolution.

Methods
Adobe illustrator is a program that helps creates vector artwork. Two phantoms were designed and fabricated using photolithography. A line-pair phantom can be used to determine the spatial resolution of the imaging modality by returning signals from differently spaced, alternating reflective and non-reflective surfaces. Adobe illustrator is a program that helps creates vector artwork. Two phantoms were designed and fabricated using photolithography. A line-pair phantom can be used to determine the spatial resolution of the imaging modality by returning signals from differently spaced, alternating reflective and non-reflective surfaces. Adobe illustrator is a program that helps creates vector artwork. Two phantoms were designed and fabricated using photolithography. A line-pair phantom can be used to determine the spatial resolution of the imaging modality by returning signals from differently spaced, alternating reflective and non-reflective surfaces.

Terahertz (THz) radiation occurs between the frequencies of 0.3 THz to 3 THz in the electromagnetic spectrum. THz waves have unique properties such as acute sensitivity to water, low-power, non-ionizing energy etc making it ideal for safe medical imaging applications. The high sensitivity of THz to water lends itself to the diagnosis of burn injuries, skin cancer, and corneal hydration studies. In this study, we used a novel, reflective THz imaging system that operates at 0.5 THz center cycling frequency to characterize its signal and spatial resolution. Line-pair phantoms are useful calibration targets to determine the functional parameters of an imaging system. We aim to fabricate a phantom using photolithography techniques to characterize the operating parameters of our device, specifically the spatial resolution.

Results
Adobe illustrator is a program that helps creates vector artwork. Two phantoms were designed and fabricated using photolithography. A line-pair phantom can be used to determine the spatial resolution of the imaging modality by returning signals from differently spaced, alternating reflective and non-reflective surfaces. Adobe illustrator is a program that helps creates vector artwork. Two phantoms were designed and fabricated using photolithography. A line-pair phantom can be used to determine the spatial resolution of the imaging modality by returning signals from differently spaced, alternating reflective and non-reflective surfaces. Adobe illustrator is a program that helps creates vector artwork. Two phantoms were designed and fabricated using photolithography. A line-pair phantom can be used to determine the spatial resolution of the imaging modality by returning signals from differently spaced, alternating reflective and non-reflective surfaces. Adobe illustrator is a program that helps creates vector artwork. Two phantoms were designed and fabricated using photolithography. A line-pair phantom can be used to determine the spatial resolution of the imaging modality by returning signals from differently spaced, alternating reflective and non-reflective surfaces.

Conclusion
During our time in the SMARTS program we used multidisciplinary imaging techniques for our assigned projects, such as the designing of line pair phantoms and the UCLA logo target as seen in Figure 2. We worked with electrochemical techniques for the photolithography process (Figure 3) to fabricate both phantoms as seen in Figure 4. Fabricating the line pair phantom was very important in determining the THz imaging system in both spatial resolution and spot size. Having explored applications of THz imaging at a design level, we would like to investigate the potential of THz in more sophisticated systems, such as living organisms or ex vivo biological samples, in the future.

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