

SOCIETY OF PHYSICS STUDENTS (SPS) COLLOQUIUM

Using a 3D Simulation Code to Design Higher Power Terahertz Amplifiers with Metamaterials for Biomedical Applications

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Abstract:

Myriads of various applications can be clearly observed utilizing the different radiation frequencies of the electromagnetic spectrum. On that continuum, the region between .3 and 3 Terahertz (1 THz = 10^{12} cycles per second) persists as being the last section of the spectrum that is not only underutilized, but also underdeveloped due to a current inability to significantly amplify a THz signal for the goal of analyzing data involving that particular frequency. There is a plethora of amazing applications for THz waves in many different fields. One of the more profitable, both monetarily and as a benefit to humanity, is that of medical imaging.

My assignment during my summer fellowship at NASA was to use finite element coding on a computer to simulate various Traveling-Wave Tube (TWT) electronic circuit designs. These circuits are to be used to amplify THz signals. Using metamaterials (engineered materials that have properties not observed in nature), I was to optimize the circuit design to increase the efficiency of power conversion from an electron beam to a THz wave. The end goal of the entire, three-year project that I was taking part this summer in is to develop a circuit design for 1 Watt at .4 THz.

WHERE

SI – 117 (room next to the Physics Computer Lab)

WHEN

11:55 am

Thursday, October 26, 2006

Pizza served before the colloquium