

# TOUP International Conference and Expo on <u>c e s</u> **Materials Science & Engineering**

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## Intense THz radiation source using double negative metamaterials

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In this paper, we propose a new method to generate intense THz surface wave via reversed Cherenkov radiation (RCR) using a sheet beam bunch traveling parallel to and over a half space filled with double-negative metamaterials (DNMs). We derive theoretical expressions for the field components and results of numerical computation. These results show strong enhancements of the RCR and the THz surface wave. The methods to enhance the RCR and surface wave are discussed in detail. And then the physical mechanisms for these enhancements are summarized. The strong enhancements of the RCR and the THz surface wave over a narrow frequency band make compact, high-power THz vacuum electron devices and particle detectors feasible.

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#### **Biography**

Zhaoyun Duan has completed his Ph.D from University of Electronic Science and Technology of China (UESTC) in 2004 and worked as a visiting scientist in MIT from 2007 to 2008. He is the Vice director of Institute of High Energy Electronics. He has published more than 100 papers in reputed journals and conferences and serving as an editorial board member of the Wireless Engineering and Technology.

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## The detection of multi-scale structures in glasses and complex materials

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We will discuss the application of statistical mechanics based methods for the detection of general structures in networks, lattices, and amorphous physical systems on all scales. These methods enable the detection of the pertinent system structures. We have invoked this method for the analysis of complex physical systems and mega-scale networks. We specifically analyze lattices and spin systems with defects and various glass formers (including an analysis based on experimental data of metallic glass alloys) to ascertain dominant structures at different temperatures. We will discuss general features of the phase diagram related to this analysis. Extensions of our method may be applied to image segmentation and other fields.

### Biography

Zohar Nussinov received his PhD (Physics) from UCLA (2000). He was subsequently a postdoctoral researcher at the Lorentz Institute for Theoretical Physics (Leiden, the Netherlands) and the Theoretical Division at Los Alamos National Laboratory. He joined Washington University in St. Louis as a tenure track faculty in 2005 where he became an associate professor in 2012. He has published more than 80 articles in various areas of theoretical (and experimental) physics.

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