

# Jongbum Kim

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November 12, 2018  
Texas Tech University  
Department of Physics  
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Dear Search Committees,

I am writing to express my interests in a tenure-track Assistant Professor position at the Department of Physics and Astronomy at the Texas Tech University. I am currently a postdoctoral researcher in **Prof. Jeremy Munday**'s lab at the University of Maryland. I hold a doctoral degree in electrical engineering from Purdue University where I worked with **Prof. Alexandra Boltasseva** and **Prof. Vladimir Shalaev**.

During my Ph.D studies, my research has mainly focused on the establishment of metal oxides as key components in nanophotonics from the realization of diverse optical devices including a waveplate metasurface, an optical sensor, and an ultrafast optical modulator. The optimized metal oxides thin films deposited by *pulsed laser deposition (PLD)* have enabled the ultimate device performance. In addition, I have explored the intriguing optical properties in metal oxides such as epsilon near zero (ENZ) and nonlinear carrier dynamics which give access to a new regime of wave dynamics for the realization of the novel technique to control the light. As a postdoctoral researcher, I am currently working on the improvement of hot carrier generation in noble metals and the development of photodetection techniques applicable to Si-phonic devices.

The ultimate goal of my research program is three-fold: **1)** the study on the fundamental physics of the emerging optical phenomena such as ENZ, nonlinearity induced by carrier dynamics, hot carrier generation, and Casimir force in quantum electrodynamics for the realization of novel classes of light-control devices and tunable devices, **2)** the research on novel material platforms for nanophotonics to extend the spectral range of application domain and to improve the device performance, and **3)** the development of building blocks for the construction of high density photonic circuit based on the research on both novel mechanisms and materials.

I believe my research will benefit from and complement the strong nanophotonic and photonic related programs at the Texas Tech University. I look forward to developing exciting collaborations from both experimental and theoretical groups at Texas Tech University.

Enclosed are my curriculum vitae, a brief research and teaching statement, and a list of references. Please contact me for any additional information. Thank you for considering my application and I look forward to hearing from you.

Sincerely yours,

Jongbum Kim

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