Colloquium Vasily Zhakhovsky

March 19th 2018 15:00 Zuidhorst 286

Title

"Nano-structuring of metal surface by ultrashort laser pulses seen through the perspective of molecular dynamics simulation"

Abstract:

Ultrafast energy deposition of femtosecond laser pulse in a surface layer of metal results in a sequence of phenomena including supersonic melting of heated layer and formation of compression and rarefaction waves. The rarefaction/stretching wave propagates into the bulk of target and can produce the large enough stretching of the molten material to cause the bubble nucleation, cavitation and jetting resulting in dynamical surface nano-structures. Results of our atomistic simulations demonstrate that, due to the ultra-fast cooling by thermal conduction and resolidification of supercooled liquid, the frozen nano-structures are formed at later times. MD simulation reveals the underlying mechanisms of such nano-structuring for different metals and laser pulse characteristics.

Biography

Vasily Zhakhovsky is a principal researcher of Center for Fundamental and Applied Research at All-Russia Research Institute of Automatics in Moscow, since February 2014.
He received his PhD in Thermodynamics and Molecular Physics from Joint Institute for High Temperatures, Russian Academy of Science in 1997 under advisement of Prof. Sergey Anisimov. Then, he worked two years as a Postdoctoral Fellow of Japan Society for Promotion of Science with host Prof. Katsunobu Nishihara at ILE, Osaka University, where he received an Award on Academic Achievement of Osaka University in 2001. After eight years at ILE as a senior research scientist, Vasily joined to the faculty of University of South Florida in 2009 as a research associated professor. He came back to Russia in 2013.

Dr. Zhakhovsky has twenty five years of experience with applications of Molecular Dynamics and Mote-Carlo simulation techniques in shock wave physics, detonation and laser-matter interaction including ablation and spallation. He has several tens publications in refereed journals including Science Advances, Physical Review B, E, and Physical Review Letters.
His publications and projects are available via
https://www.researchgate.net/profile/Vasily_Zhakhovsky