Nike krypton laser achieves spot in Guinness World Records

July 24 2014

A set of experiments conducted on the Nike krypton fluoride (KrF) laser at the U.S. Naval Research Laboratory (NRL) nearly five years ago has, at long last, earned the coveted Guinness World Records title for achieving "Highest Projectile Velocity" of greater than 1,000 kilometers per second (km/s), a speed equivalent to two-and-a-quarter million miles per hour.

The previous record was held by researchers at Osaka University's Institute of Laser Engineering in Japan, who in 2006 used a neodymium glass (Nd:glass) laser to accelerate a target to 700 km/s. The record, currently held by NRL, was achieved in collaboration with the NRL Plasma Physics Division and the group from Japan, demonstrating the advantages of the high uniformity and short wavelength of the KrF laser technology.

"The impact of the highly accelerated target on a stationary foil generated thermonuclear fusion neutrons whose energy spread indicated that a gigabar—that's the pressure of a billion atmospheres—was achieved in the collision," said Dr. Max Karasik, NRL Laser Plasma Branch. "The results highlight the advantages of a krypton-fluoride laser in efficiently generating uniform pressures required for fuel compression in inertial confinement fusion."

In the experiments, thin plastic foils were accelerated to 1,000 km/s over a distance of less than a millimeter. The moving foils then collided with a stationary foil, generating thermo-nuclear temperatures and neutrons

from fusion reactions. The high ablative pressure applied to compress and accelerate targets is used in inertial confinement fusion and high energy density research.

NRL received the official Guinness World Records certificate, February 2014, with distinction given to the research that "…probe[s] possibilities for future clean-energy sources." However, since the 2009 experiment, Karasik says NRL has raised the bar. With an improved laser pulse shape, researchers at the Nike laser facility have reached target velocities of 1,180 km/s.

Provided by Naval Research Laboratory

Citation: Nike krypton laser achieves spot in Guinness World Records (2014, July 24) retrieved 10 May 2024 from https://phys.org/news/2014-07-nike-krypton-laser-guinness-world.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.