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Grand Challenges in Science and the Opportuntites Afforded by DOE's New X-ray Laser Project¹

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The National Academy of Sciences, Department of Energy Office of Science and National Science Foundation have recently defined a set of scientific “Grand Challenges” for the 21st Century. DOE's interest is a secure and sustainable energy future in a clean environment. Addressing many of the challenges will require an X-ray laser - a coherent ultra-bright light source whose wavelength is of atomic dimensions. The machine will cost \$1-2B, and will be based on technology developed at Jefferson Lab. In this talk we will address the science motivating the X-ray laser, will describe the physics and nature of the source itself, and talk about JLab's Free Electron Laser program and Virginia's potential role in this project.

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