

THE PUSH TOWARDS SHORT X-RAY PULSE GENERATION USING FREE ELECTRON LASERS

A. Zholents, ANL, Argonne, USA

Abstract

X-ray free electron lasers (FELs) are well suited to pursue a long-standing goal of studying matter in a transient state that is far from equilibrium. This state often determines the functions of materials and, thus, holds a key to understanding how to control them. The natural time scale for most of the dynamic processes involving atoms is of the order of 100 femtoseconds, and existing x-ray FELs have already surpassed this mark. The natural time scale for dynamic processes driven by electrons is of the order of 100 attoseconds, and this is the next Rubicon for FELs. In this talk I will review the state of the art in generation of femtosecond x-ray pulses using FELs and will discuss a number of new ideas en route to sub-femtosecond x-ray pulses.

**CONTRIBUTION NOT
RECEIVED**