Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Laboratory astrophysics on FEL light sources YUTONG LI, Institute of Physics, Chinese Academy of Sciences — XFEL is a novel tool to study high energy density (HED) matter and physics. Taking the advantages of high brilliance, ultrafast time resolution (fs), ultrahigh spatial resolution (sub micrometer), and high penetration ability to high density regions, one can apply it to create and probe HDE matter. In this talk, several examples will be discussed. One of them is magnetic reconnection (MR), which is believed to play an important role in many different plasma phenomena including solar flares, star formation, and other astrophysical events. We have constructed the topology of MR in laboratory by using Shenguang II laser facility in Shanghai. However, direct measurement of the physics of the electron diffusion regions have not been done since high spatial and temporal resolution are required, particularly, if when it is driven by PW short laser pulses. With XFEL, one can measure the electron current sheet directly, which is a key issue to understand the MR. Another example is the magnetic field-induced Weibel instability in collisionless shock waves, which is relevant to the supernova remnants. With the XFEL, one can directly probe the generation and evolution of the fine structure of the filaments in the collisionless shock waves.

Yutong Li
Institute of Physics, Chinese Academy of Sciences

Date submitted: 12 Jul 2013 Electronic form version 1.4