

**POLFEL – THE HIGH AVERAGE POWER FREE ELECTRON LASER****G. Wrochna<sup>1</sup>, J. Jasielski<sup>1</sup>, J. Krzywiński<sup>2</sup>, R. Nietubyć<sup>1</sup>, J. Pełka<sup>3</sup>, E. Pławski<sup>1</sup>,  
J. Sekutowicz<sup>4</sup>, R. Sobierajski<sup>3</sup>, and J. Szewiński<sup>1</sup>**<sup>1</sup>*The Andrzej Soltan Institute for Nuclear Studies PL-05500 Świerk, Poland*<sup>2</sup>*SLAC National Accelerator Laboratory, 2575 Sand Hill Road, Menlo Park, CA94025, USA*<sup>3</sup>*Institute of Physics PAS, Al. Lotników 32/46, PL-00668 Warsaw, Poland*<sup>4</sup>*Deutsches Elektronen-Synchrotron, Notkestrasse 85, D-22667 Hamburg, Germany**Keywords: free electron laser, linear accelerator, vacuum ultraviolet (VUV) source.**\*) e-mail: wrochna@ipj.gov.pl*

A high average power VUV range free electron laser POLFEL is planned at The Andrzej Soltan Institute for Nuclear Studies in Świerk. The project is to satisfy the demands for the intense coherent VUV light beam declared by numerous conventional laser laboratories as well as synchrotron radiation users. We recognize it as an important step in the growth of the experimental capabilities in natural sciences and material engineering as well as a development of the FEL physics and technology.

The forthcoming paper will overview the general layout of the planned facility, paying a special attention to its novel solutions. The ground breaking feature of POLFEL is a continuous wave (cw) or near-cw operation. It will be achieved with a linear superconducting (sc) accelerator fed with a low emittance sc-electron injector furnished with the thin film sc lead photocathode. In the article, we will present the

results of the electron beam dynamics start-to-end simulation, a concept of variable polarization undulator, layouts of the diagnostics, timing and synchronization systems and general design of a two-fold branched beamline containing high energy resolution and high energy density experimental stations.

We will describe a number of experiments constituting a preliminary approach to the scientific programme of the proposed FEL facility. The all presented experimental techniques, base on the work being hitherto conducted in numerous laser and synchrotron laboratories. They will extensively benefit from the new features brought by the proposed FEL source.

A brief overview of the POLFEL concept is presented in the paper published in the current issue.