

POLFEL - A high average power free electron laserGrzegorz Wrochna*The Andrzej Soltan Institute for Nuclear Studies (IPJ), Otwock-Świerk 05-400, Poland**e-mail: Grzegorz.Wrochna@fuw.edu.pl*

A construction of high average power free electron laser represents an interesting scientific initiative for the wide range of users. Physicists, chemists, biologists, material engineers search for the light which combines several properties: coherence, brightness, high average intensity, short pulse duration and wide range of tuneability which are achievable apart, but never at the same experimental station. Such a beam would enable new advanced experiments and facilitate the exploration of phenomena inaccessible in other way. To launch and operate such a source is also a scientific challenge for accelerator physicists who are currently involved in a development of crucial technological solutions particularly in the domain of superconducting photo-injectors and continuous wave RF suppliers.

We propose to settle a high average power THz – VUV FEL facility POLFEL at the newly established National Centre for Nuclear Research in Świerk. POLFEL is planned as a node of the EuroFEL network of complementary facilities, recommended by ESFRI. The great weight of the synchrotron radiation studies in modern science and technology makes us recognize the next, fourth generation light source facility as an instrument which will effectively improve the impact of research being run in Poland. Presented concept benefits from the long and wide experience of Polish scientists and engineers involved in the FEL activities world wide.

Polfel will be built in three stages. The first of them consists of electron injector and short 10 MeV linac, which produces radiation in the terahertz frequency domain. The most important task in that stage will be to establish and get mature a continuous wave operation mode of fully superconducting accelerator. That accomplishment will be followed by the linac extension up to several tens of megaelectronvolts, which will bring the light in the wavelength ranged up to visible domain.

