

Technology aspects in preparation at NCBJ of Nb_Pb sc photocathodes for XFEL-type RF e- gun.

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A photocathode composed of a Pb layer deposited on Nb substrate is an attractive solution proposed for fully superconducting, radio-frequency electron gun to be used in the linear accelerator of the European X-ray free electron laser (Eu-XFEL) operating at Deutsches Elektronen Synchrotron (DESY) and in other, similar devices. Much effort has been put in development of deposition and post-processing of Pb films as superconducting photoemitters. These works led to a satisfactory solution based on lead deposition in a cathodic-arc followed by ex-situ smoothing of the obtained film through its re-melting with a pulsed plasma ion beam. Pb layers obtained by different procedures have been tested for their morphology, microstructure, dark current emission, quantum efficiency and impact on SRF e- gun performance. Preliminary results are presented of recent Pb coatings on Nb aimed at further improvement of the film smoothness.

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