

# Measurements and analysis of depth-resolved photoluminescence spectra in swift heavy ion bombarded insulators

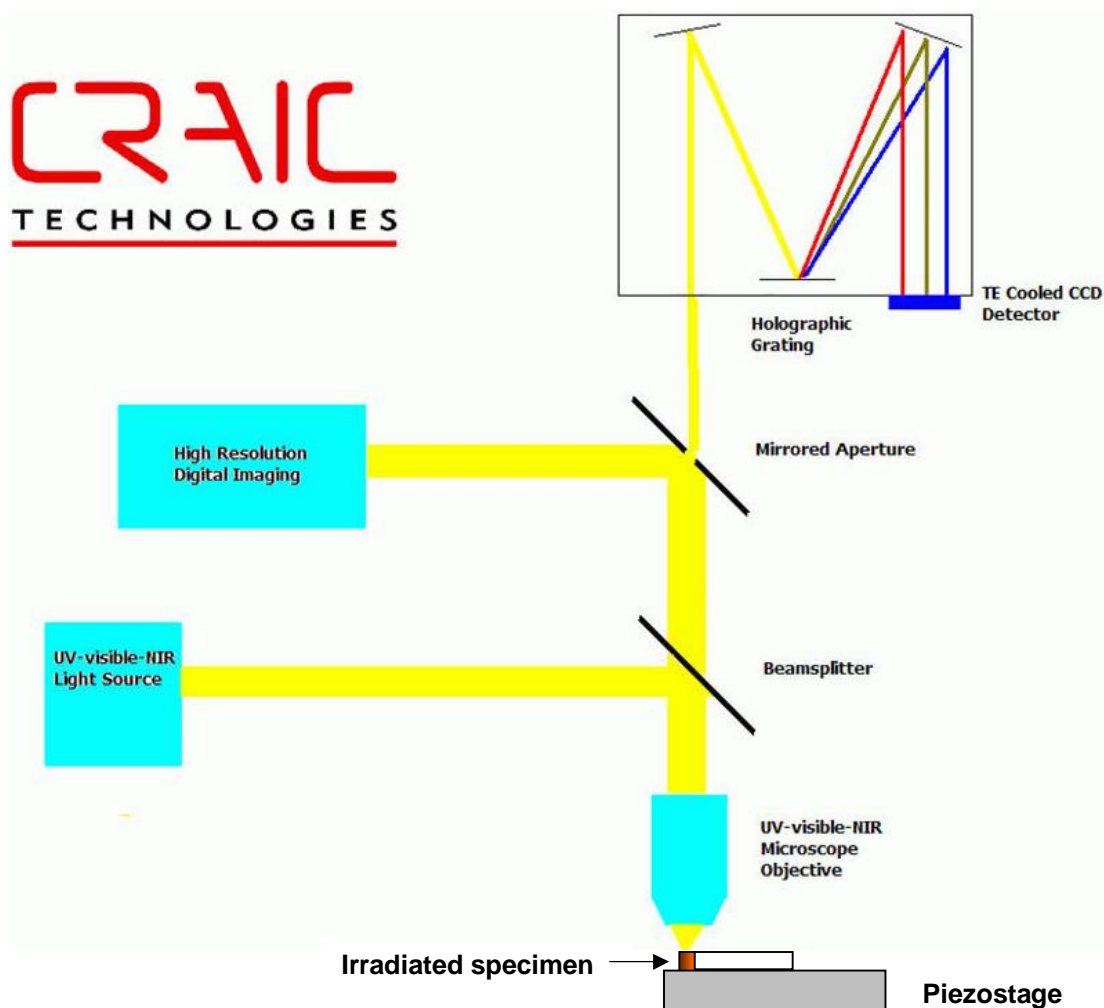
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**Goal of the Project:** Aim of proposed practical work is to gain an experience of students in application of optical spectroscopy methods in studies of radiation damages, namely in finding of depth profiles of defects and correlated mechanical stresses in some insulating crystals irradiated with (1÷3) MeV/nucleon heavy ions by using photoluminescence technique. Utilization of ion beams in this energy range offers a unique possibility to simulate fission fragment impact.

Luminescent spectroscopy methods are widely used for characterization of lattice disorder in solids induced by energetic charged particles. Usually, in such experiments the integrated luminescence signal affected by radiation defects and mechanical stresses in total probed volume is registered. At the same time, non-uniform energy deposition along ion path suggests the complicated dependence of luminescence efficiency on the target thickness. To get information about spatial distribution of luminescence centers through the irradiated layer with micron or even submicron resolution one can use the microluminescence or laser confocal scanning microscopy techniques.

Experimental set-up is based on QDI 302™ Microscope Spectrophotometer ([www.microspectra.com](http://www.microspectra.com)) equipped with one-coordinate piezostage, which moves the specimen under objective with accuracy of 200 nm.





During practice the students

- will be introduced in technique of ion irradiation experiments at IC-100 cyclotron;
- will participate in measurements of depth resolved photoluminescence spectra from LiF irradiated with 1.2 MeV/nucleon Ar and Xe ions, data processing and analysis.

The students should have basic knowledge in solid state physics.

Number of students -2

Supervisor – Dr. Vladimir Skuratov ([http://flerovlab.jinr.ru/flnr/ion\\_imp.html](http://flerovlab.jinr.ru/flnr/ion_imp.html))