APPLICATIONS OF PROTON INDUCED X-RAYS AT THE TANDEM ACCELERATOR LABORATORY OF NCSR "DEMOKRITOS"

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At the Tandem accelerator laboratory of the National Centre for Scientific Research (NCSR) "Demokritos", energetic (1-3 MeV) proton beams have been used for elemental analysis (Particle Induced X-ray Emission-PIXE), and to generate quasi monochromatic X-rays through the irradiation of pure targets with high beam current (≈few hundreds of nA) and the use of appropriate filters [1].

The standard PIXE analysis with ≈1 mm^2 beam size was employed mainly in the external ion-beam set-up by analyzing ancient/historical materials and artifacts such as glass beads, glazed ceramics, historical icons and contemporary paintings [2, 3]. From a different angle and analytical objectives, the quasi-monochromatic X-rays induced by protons have been exploited towards their use for selective XRF analysis and for the experimental study of atomic processes and X-ray interactions with matter [4, 5]. The paper presents an overview of X-ray spectrometry applications using proton induced X-rays at NCSR 'Demokritos" Tandem accelerator laboratory and discusses future perspectives in view of the upgrade instrumentation program currently in progress [6].

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