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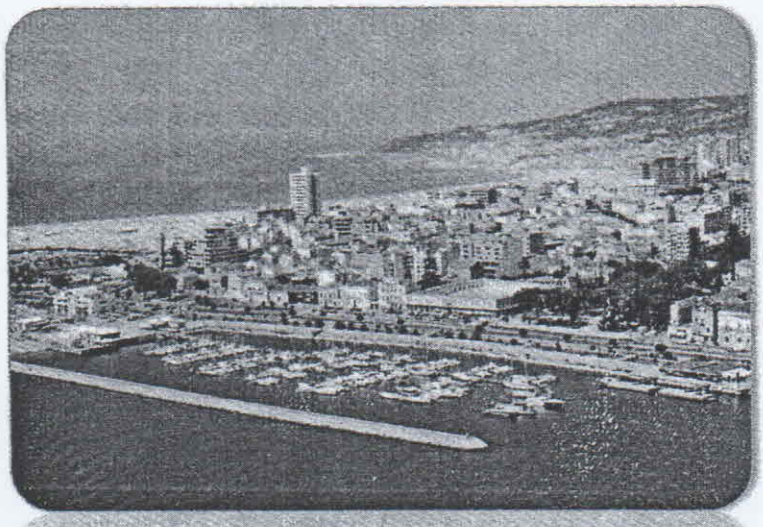

BOOK OF ABSTRACTS

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Combination of LiF detectors with polycapillary optics for X-ray high resolution imaging

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Novel lithium fluoride (LiF) thin-film imaging detectors for X-rays of energy from 20 eV [1] to 10 keV [2] have been recently proposed and successfully tested. Among the main peculiarities of the LiF-based detectors are intrinsic high spatial resolution on a large field of view and a wide dynamic range. Moreover they allow ease of use, as insensitive to visible light, and they need no development process after X-ray exposure, as the reading process is based on detection of the visible photoluminescence of stable aggregate color centers formed by the impinging radiation. They assure great versatility, as they can be grown in the form of thin films on different substrates by well assessed physical deposition techniques [3].

Polycapillary optics has recently attracted the increasing attention of the researchers for its high efficiency as a device for handling of both x rays and thermal neutrons. In particular, many experiments have highlighted the advantage of using polycapillary optics for X-ray imaging [4]. In order to improve the resolution for X-imaging, LiF films were used as innovative imaging detectors in contact mode with a table-top source (a conventional Cu 50 Watt X-ray tube combined with a polycapillary optics semi-lens). The stored images were read with an optical confocal microscope in fluorescence mode. The measured spatial resolution on several samples, including geometrical masks and biological objects, was less than 1 μm [2,5].

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Determination of Concrete Features by Images Obtained From X-Ray Microtomography

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In the past years researches have been done to develop methods of non-destructive testing for concrete to assure a good quality of the material when requested. The analysis of the images can be classified as a type of non-destructive methods that make possible the relation between the microstructure of the material and its physical and mechanical properties. In this research a method of analysis of digital images obtained by X-Ray microtomograpfy of concrete specimens is proposed, with the objective of evaluate the porosity and the size of the pores in the concrete matrix. Fourteen specimens of simple concrete were microtomographed, each having approximately two centimeters of diameter and five centimeters of height with compressive strength of 20MPa and 30Mpa. Approximately nine hundred of images were obtained of each specimen. The microtomographies were done in a Skyscan 1172 system (100kV). Routines written in MATLAB© was used to adjust the images in contrast, binarize and filter it using morphological operations to remove isolated points, interpreted as noise. In this processed images the empty spaces and the size of the pores in the matrix are counted.