

The IMAT imaging system at ISIS

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IMAT will be a cold neutron radiography and diffraction instrument for engineering applications, with a large single-frame neutron bandwidth of 6 Å taking advantage of the 10Hz operation on ISIS TS-2. IMAT will enable conventional neutron radiography, tomography and neutron diffraction applications. In addition, it will offer novel energy-selective neutron imaging techniques as well as combined imaging-strain-texture studies.

IPCF-ME, in collaboration with ISIS staff, has been involved in the preliminary tests for individuating the better up-to-date solutions to be adopted for the final imaging device. Now the final design of the imaging camera has been produced and the device is currently under construction in the laboratories of IPCF-ME. The timetable requires that the camera must be ready and tested from the optical and mechanical stability point of view within the end of November 2012. At the end of the same year the camera will be transferred at ISIS for the first tests on the neutron beam.

The project had to fulfill a number of preliminary requests, frequently contrasting between themselves. Among them we can mention: a large field of view; a design suitable to obtain a compact, light and transportable camera box; a minimization of the volumes of materials directly exposed to the neutron flux; good stability of the optical alignment (or self-alignment ability); a safe position of the CCD, far enough from the neutron beam; the possibility of selecting different magnification ratios with a minimum spatial resolution of 50 microns; a high temporal resolution and TOF capability; a user friendly design. Furthermore, the instrument must be as versatile and flexible as possible to enable swift interchanges between imaging and diffraction modes and to allow for future upgrades of neutron imaging technology.

We will present the results of the preliminary tests which have led to the final design of the camera. The detailed project of the imaging system will be presented and discussed.

Primary author: Dr ALIOTTA, Francesco (Istituto per i Processi Chimico-Fisici, Consiglio Nazionale delle Ricerche)

Co-authors: Dr VASI, Cirino (IPCF-CNR); Dr SALVATO, Gabriele (IPCF-CNR); Dr PONTERIO, Rosina Celeste (IPCF-CNR)

Presenter: Dr ALIOTTA, Francesco (Istituto per i Processi Chimico-Fisici, Consiglio Nazionale delle Ricerche)

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