

Proposta di tesi di Laurea Triennali/Magistrali -2018

IOM-CNR, Area Science Park – Basovizza, Trieste

Oocyte sorter for IVF

The selection of the oocyte for the in vitro fertilization (IVF) is one of the key features that still require to be addressed to raise its success rate. At present the selection is made by human visual inspection.

We investigated the mechanical properties of Oocytes and found a correlation between their mechanical properties and the chances of success in IVF practice. We are now involved in the design and realization of a microfluidic device able to sort automatically the oocytes on the base of the mechanical properties. The device will measure the Oocyte stiffness with a microindenter, process the data and separate the oocyte according with their properties.

The student will be involved in the project and he/she will be in charge of the design of the control circuitry, in collaboration with a nanometrology company for what concerns the indentation measurement and with microfluidic company, for what concerns the microfluidic separation.

MEMS wire scanner.

The real-time measurement of the geometrical properties of high energy particle beams is a key factor for the development and the applications of large scale research infrastructures such as Synchrotrons and free electron lasers as well as for lab equipments such as electron microscopes and X-ray diffractometer.

A simple and effective approach is to scan a thin wire on front of the beam and then record the intensity of the radiation generated. Such device is usually named wire-scanner. We recently introduced silicon-based microfabricated wire scanners, which were moved in front the beam using an external translation stage. The next step will be to drive the microfabricated scanner at its resonant frequency and acquire the same information without physically translating the whole wire and then realizing a true real-time beam monitor.

The student will be in charge of the development of the control software, and will be involved in the microfabrication of the silicon wire, in cleanroom environment, and in the wire characterization at the Bear beamline at elettra.

Contatti.

Prof. SERGIO CARRATO

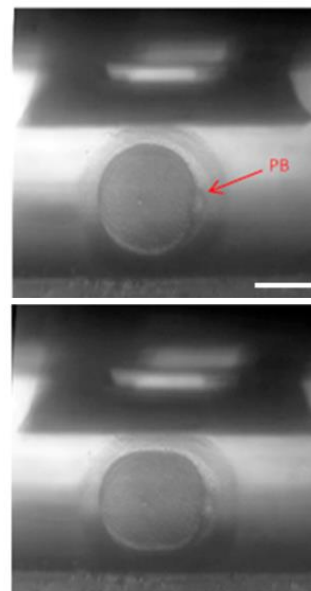
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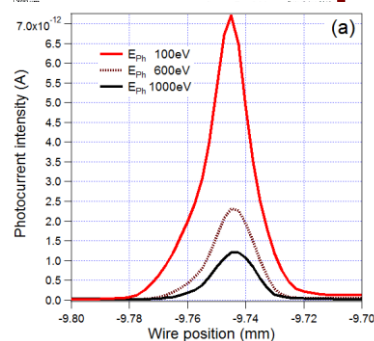
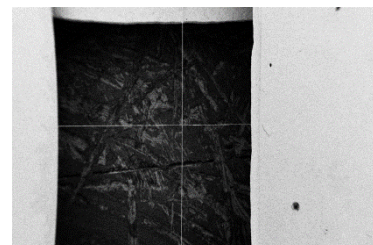
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A human oocyte under compressed under a large tip-less cantilever fabricated at IOM-CNR



1. Silicon wires in cross configuration fabricated at IOM-CNR
2. Measure of the x-ray photon beam profile for different photon energy