

The GSI heavy ion microbeam

Since 1987, a single ion hit technique is in operation on the GSI heavy ion microbeam and has been used for various applications like ion lithography, micromechanics or the investigation of radiation effects on microelectronics components. During the last years, the GSI heavy ion microprobe has been adapted for the irradiation of individual living cells in culture. This set-up presents two main peculiarities compared to the microbeams used up to now for cell irradiation. First, the beam micrometric size is obtained by magnetic focusing and not by a simple collimation. This allows to obtain a smaller beam spot, a better defined LET by avoiding the ion scattering on the edge of a collimator, and a high irradiation throughput since the beam can be positioned on each cell by means of a fast deflection system. Then, the GSI microbeam is able to focus ions from carbon to uranium with energies between 1.4 MeV/nucleon to 11.4 MeV/nucleon. The range of accessible LET is thus considerably extended compared to light ions microbeam in operation today.