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High energy heavy ion microbeam for interdisciplinary research

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Heavy ions possess much higher linear energy transfer and produce severe ionizing damage to DNA in biological sample or PN junction in microelectronics along the ion trajectory. Heavy ion microbeam and high energy microbeam is attracting more and more interests because of the clinical spread of high energy particle cancer therapy using protons and carbon beams and care of space radiation effect, especially from cosmic heavy ion rays, in spacecraft and astronauts. Such a microbeam is a powerful tool to study the spatial radiation response or the local radiation effect both in materials and biological samples to simulate the space radiation at ground, and the high energy and long penetration of hundred MeV/u beam may also expand the application of the above mentioned microbeam application to large samples. This work presents the development of the interdisciplinary experimental system at the high energy microbeam of IMP, and then shows the study of protein dynamics of DNA repair after single ion irradiations.

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