

Application of laser-driven beams for radiobiological experiments

Anna A. Friedl, Ludwig-Maximilians-University Munich, Department of Radiation Oncology, Munich, Germany

Laser-driven particle beams offer great potential for application in radiation biology and radiation therapy. Due to their smaller size, they may in future replace conventional accelerators as tools for fundamental radiobiological experiments. Presently, an increasing number of conventional accelerators are in danger of being shut down due to cost reasons or because the facilities are getting very old. In addition, due to their special characteristics, laser-driven beams allow performing new types of experiments, e.g. simultaneous exposure of cells to different radiation qualities to mimic the situation encountered by astronauts in Space or other complex exposure situations. So far, first proof-of-principle experiments performed with laser-driven particle beams have mainly concentrated on the question of whether their ultra-high dose rates influence the cellular response mechanisms and sensitivity. While this question is of high relevance for future therapeutic applications, other applications will certainly be added in future.