ST 4: Biophysical effects of very slow and of fast ions

Chair: Herwig Paretzke

Zeit: Dienstag 17:45–18:15 Raum: A021

ST 4.1 Di 17:45 A021

Deactivation of bacteria using a low temperature miniature pulsed atmospheric plasma jet — •Antje Lehmann[1], Tina Hofmann[1], Kathrin Schmidt[3], Daniela Wind[2], Andreas Schubert[3], Stefan Rupf[2], and Axel Schindler[1] — [1]Leibniz-Institut für Oberflächenmodifizierung, Leipzig — [2]Universitätsklinikum des Saarlandes, Klinik für Zahnerhaltung, Parodontologie und Präventive Zahnheilkunde, Homburg/Saar — [3]Fraunhofer Institut Zelltherapie und Immunologie, Leipzig

A cold miniature atmospheric plasma jet based on pulsed 2.45 GHz microwave excitation has been developed. Investigations are performed for developments of potential medical and dentistry applications. The present work focuses on the deactivation of biofilms built up of different bacteria.

Investigations have been performed by localized treatment of various types of bacterial films on Agar in Petri dishes and tooth samples, which have been covered with various types of bacteria. The local plasma jet treatment was reproducibly performed with the help of a computer controlled x,y,z-scanning stage. The plasma jet mean power has been optimized to limit the film temperature in the jet contact area close to human body temperature, measured in-situ by pyrometry. Variations in the processing gas mixtures consisting of helium, oxygen and nitrogen have been performed to optimize the production of reactive species in the jet measured by spatial resolved quadrupole mass spectrometry.

ST 4.2 Di 18:00 A021

Setup of a measuring station for the analysis of DNA-damage induced in cells by protons — •Philipp Schrögel[1], Andreas Teufel[1], Cecilia Pizzolotto[1], Christian Vogel[1], Wolfgang Eyrich[1], and Luitpold Distel[2] — [1]Universität Erlangen-Nürnberg, ECAP — [2]Universitätsklinikum Erlangen, Strahlenklinik

The understanding of microbiological effects of densely ionising hadron beams, especially the repair-mechanisms of clustered DNA-damage (bulky lesions), has basic relevance for the conception of future therapy facilities. The vertical beam at the Erlangen Tandem-Van-De-Graaff accelerator allows radiobiological experiments with protons with a maximum energy of 11 MeV. The measuring station has been optimised and extended. A new data acquisition system on basis of the VMEbus has been developed for the readout of the beamprofile- and monitor detector. The class-based modular programming of the readout software and the integration in the data analysis framework ROOT allow a flexible and extendable use. For determining the energy-loss properties of the protons, the energy spectra have been measured with the beam going through different absorberfoils and have been compared with simulation data. First test measurements with the pixelated silicon detector Medipix showed promising data for the energy and spatial distribution of the protons. With the irradiation of primary human fibroblasts in a small angle to the beam, the DNA damage along the tracks of single protons through the nucleus could be visualised. This allows further investigations of the repair-mechanisms.