Contribution ID: **181** Type: **Invited Talk**

Heavy Ions in Therapy and Space

Monday, 20 September 2021 10:45 (30 minutes)

Research in the field of biological effects of heavy charged particles is needed for both heavy-ion therapy (hadrontherapy) and protection from the exposure to galactic cosmic radiation in long-term manned space missions. Although the exposure conditions (e.g. high- vs. low-dose rate) are different in therapy and space, it is clear that a substantial overlap exists in several research topics, such as individual radiosensitivity, mixed radiation fields, and tissue degenerative effects. Late effects of heavy ions are arguably the main health risk for human space exploration, and with the increasing number of cancer patients treated by heavy-ion therapy, including young adults and children, this issue is now becoming the main source of uncertainty for the success of hadrontherapy as well. Reducing uncertainty in both cancer and noncancer late risk estimates is therefore the first priority in heavy-ion radiobiology. In addition, researchers involved either in experimental studies on space radiation protection or heavy-ion therapy often use the same accelerator facilities. Several heavy-ion therapy facilities are now under construction or planned in Europe, USA, and Japan. Beamtime will be available at these facilities for clinical radiobiology and basic heavy-ion effects experimental research, as already happens since several years at the HIMAC in Japan. The NASA Space Radiation Laboratory (NSRL) in Brookhaven (Long Island, NY) provides beams of very heavy ions at energies around 1 GeV/n which are of specific interest for space radiobiology. In Europe, these very high energy beams are available at GSI in Germany, where the new Facility for Antiprotons and Ion Research (FAIR) is currently under construction. It is foreseeable that the availability of beamtime and the presence of many dedicated research programs will lead to great improvements in our knowledge of biological effects of heavy ions in the coming few years.

Primary author: DURANTE, Marco (GSI)

Presenter: DURANTE, Marco (GSI)

Session Classification: Session 1

Track Classification: Applied Nuclear Physics