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Applications of Nanodosimetry in Particle Therapy Planning

Wednesday, 7 September 2022 14:00 (40 minutes)

In this talk, I will give an overview of the applications of nanodosimetry in particle therapy treatment planning [1]. My talk will summarize the underlying concepts of nanodosimetry and describe the development and current status of nanodosimetric detector technology. I will also give an overview of Monte Carlo track structure simulations that provide nanodosimetric parameters for proton and ion therapy treatment planning. Classical and modern radiobiological assays that can be used to demonstrate the relationship between the frequency and complexity of DNA lesion clusters and nanodosimetric parameters will be reviewed. Lastly, I will review existing approaches of treatment planning based on RBE models or dose-averaged linear energy transfer and contrast them with the RBE-independent approach based on nanodosimetric parameters.

REFERENCES
[1] A. Rucinski, A. Biernacka, and R. Schulte, Applications of nanodosimetry in particle therapy planning and beyond, Phys. Med. Biol. 66 (2021) 24TR01, DOI: https://doi.org/10.1088/1361-6560/ac35f1

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