Contribution ID: **21** Type: **not specified**

FLASH understanding: the radiobiology program of FRIDA-WP1

Despite growing and accumulating evidence,the FLASH effect - i.e. the differential sparing of normal tissue versus a same efficacy on the tumor, when radiation is delivered at an ultra-high dose rate, as compared to a conventional way - remains largely unexplained mechanistically, a limit which hinders importantly its potential for a clinical translation. In this context the Workpackage 1 "FLASH understanding" of the FRIDA INFN Call, "Flash Radiotherapy with High dose rate beams" is dedicated to contribute to unravel this issue with a combined modelling and experimental approach. An overview of the experimental ongoing and planned in this framework, in particular, those based at the TPBL, for proton FLASH irradiations of in vitro same at different oxygen concentrations, DNA damage analysis, radiation chemical tests, also in comparison with the same performed at the Pisa Electron FLASH facility will be reported and critically discussed, in connection with the parallel modelling activities.

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