Angewandte Physik und Messtechnik, LRT 2

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Master Thesis

**Super resolution microscopy of DNA double strand breaks in human cancer cells**

Our research focuses on the structural clustering of DNA double strand break markers on DNA double strand breaks (DSB) caused by irradiation with heavy ions.

Human cancer cells get irradiated by 55 MeV carbon ions or 20 MeV protons at the ion microprobe SNAKE (Superconducting nanoscope for applied nuclear Experiments) in Garching and imaged by a STED (STimulated Emission Depletion, Nobel prize 2014) microscope. This provides a resolution below the Abbé limit of imaging of around 100 nm.

In this project the correlation of the DSB repair protein BRCA1 with several other DSB markers has to be examined with a special focus on the time development of clustering in the first 2h of damage repair.

This experimental work will give insight into optics, microscopy, radiation biology and radiation physics and is performed in collaboration with LMU radiation biology institute within the cluster of excellence MAP.



*Repair factors Rad 51 and -H2AX imaged by STED-microscopy. The two repair factors anticorrelate in their intensity telling about different repair pathways.*

merge

-H2AX

Rad 51

500 nm