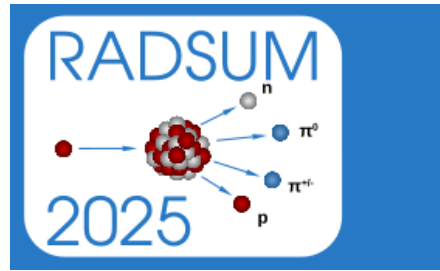


# RADSUM - Topical Workshop on RADIation effects in SUPERconducting Magnets



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## Fusion magnets and their radiation environment

*Wednesday 15 January 2025 16:40 (20 minutes)*

Among the key enabling technologies of compact fusion reactors there are high-temperature superconducting (HTS) magnets. Despite the great improvements recently achieved, one of the main challenges that still need to be faced is the evaluation of the impact of radiation in HTS tapes.

To face this challenge, it is crucial to have a comprehensive view of the radiation environment the HTS will be exposed to. This environment strongly depends on the reactor design, so that advanced 3D neutronics simulations are needed.

In this talk we give examples of the radiation environment of superconducting magnets in fusion reactors estimated with Monte Carlo simulations using the PHITS code on 3D CAD-imported models.

This approach yields the expected neutron and secondary particles spectra impinging on the HTS material at the working conditions, the map of the deposited power and information about the damage in terms of displacement per atom (dpa) and Primary Knock-on Atom (PKA) spectra. The output of such simulations can then be used as input for detailed thermal, structural electromagnetic and atomistic damage analysis.

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