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The Tetra-Ball single moderator neutron spectrometer

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Tetra-Ball is a spherical single-moderator neutron spectrometer (SMNS) under development at INFN. As others SMNSs previously developed within INFN-based projects, it is equipped with active internal detectors and condenses the functionality of a Bonner sphere spectrometer, but it requires only one exposure to extract the spectrometric information from thermal to GeV neutrons. Compared to its SMNS predecessors, Tetra-Ball design was optimised in terms of radiation resistance and reduced number of detectors.

Tetra-Ball was conceived as a portable neutron spectrometer to be integrated in the BRIL (Beam Radiation, Instrumentation and Luminosity) system for monitoring the CMS cavern during the Phase II of LHC-High Luminosity.

This communication describes the general structure of the Tetra-Ball design and, focusing on the results of the Monte Carlo simulations, its expected response to the neutron fields typically encountered in the CMS cavern.

Scientific Topic 1

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Shielding and dosimetry

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