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Damage experiment with superconducting sample coils - experimental setup and observations during beam impact

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The damage mechanisms and limits of superconducting accelerator magnets caused by the impact of high-intensity particle beams have been the subject of extensive studies at CERN in the recent years. Recently, an experiment with dedicated racetrack coils made of Nb-Ti and Nb₃Sn strands was performed in CERN's HiRadMat facility. In this paper, the design and construction of the sample coils as well as the results of their qualification before the beam impact are described. Furthermore, the experimental setup is discussed. Finally, the measurements during the beam experiment such as the beam-based alignment, the observations during the impact of 440 GeV protons on the sample coils and the obtained hotspots and temperature gradients are presented.

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Footnotes

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Yes

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