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Quantitative availability modelling for the MYRRHA accelerator driven system

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The availability of modern accelerators has become a key performance indicator. This is especially the case for accelerator-driven-systems (ADS), such as MYRRHA, which need to deliver beam with very few interruptions longer than a few seconds over a period of several months.

Quantification of such beam interruptions at other accelerators such as LINAC4 at CERN and SNS at ORNL show that their fault count would need to be reduced by more than two orders of magnitude to comply with ADS requirements. Redundancy of systems is one viable strategy to achieve this. For MYRRHA, the use of redundant low-energy injectors, modular-redundant RF power amplifiers and serial-redundant RF cavities is presently proposed. The resulting gain in the accelerator availability using these redundant systems has been quantified by simulating the operation of the MYRRHA accelerator with AvailSim4, an availability-modelling tool developed at CERN. The study results highlight the importance to focus on optimizing system design and repair strategies to maximize the effectiveness of such redundancy schemes as well as the value of powerful availability simulation tools.

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Footnotes

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Yes

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