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## Design optimization of the water-cooled coil for the LEIR extraction septum

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A pulsed septum magnet (SMH40) is used for heavy ion extraction from the Low Energy Ion Ring (LEIR). A non-conformity on the coil cooling circuit made it necessary to consolidate the design of the septum blade and related manufacturing process. A stringent failure analysis, including structural analysis and computational fluid dynamics, combined with destructive and non-destructive testing, has allowed to identify a design weakness. Subsequently, a new manufacturing process has been proposed, fully validated by numerical computation and after production of a 1:1 prototype. The achieved leak-tightness and cooling performance as well as optimization of the manufacturing process shall significantly increase the operational life cycle. This paper describes results from the initial root cause analysis and summarizes the design iterations and final results.

### Funding Agency

### Footnotes

### I have read and accept the Privacy Policy Statement

Yes

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