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Upgrade tuning system 3rd harmonic cavity SLS 2.0

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As part of the SLS2.0 upgrade, it was foreseen to upgrade the tuning system of the 3rd harmonic cavity of the storage ring. The complete tuning system is installed in an isolation vacuum and has direct contact to a 4 Kelvin source, which means all components have to perform in cryogenic conditions. The existing system comprised of a standard stepper motor and a coated spindle with two hard-stops at both ends. The new installed tuning system offers now better adapted stepper motor including temperature sensor and position encoder. The spindle was also changed to a roller-bearing system. To design the mechanical setup we analyzed the required forces which are required to deform the superconducting Niobium-coated copper cavities. The torque of the motor is multiplied by a lever-arm system and the pitch of the roller-bearing. Based on this analysis, we designed and purchased the complete mechanism which was then successfully installed and integrated into the SLS2.0 environment. On the poster I will lay out the analysis, findings and solutions to share it with the community with similar systems.

Footnotes

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