IPAC'23 - 14th International Particle Accelerator Conference



Contribution ID: 1645 Contribution code: THPM031

Type: Poster Presentation

Evaluation of green laser source additive manufacturing technology for accelerator applications with ultra-high vacuum requirements

Thursday 11 May 2023 16:30 (2 hours)

Additive Manufacturing (AM) offers different benefits such as efficient material usage, reduced production time and design freedom. Moreover, with continuous technological developments, AM expands in versatility and different material usage capabilities. Recently new energy sources have been developed for AM –green wavelength lasers, which provide better energy absorption for pure copper. Due to high thermal and electrical conductivity of copper, this novel AM technology is highly promising for various industries, particularly, there is a huge interest to use it for accelerator applications. In particular, these AM produced accelerator components should reach the associated Ultra High Vacuum (UHV) requirements. In this study, vacuum membranes of pure copper were produced by AM using a green laser source, in different thicknesses and built angles. Furthermore, a vacuum membrane helium leak tightness test was performed at room temperature by using a high-sensitivity mass spectrometer. Comparison of these test results was performed with previously established results. Through this study, novel knowledge and initial results are provided for green laser source AM technology usage for applications for UHV accelerator components.

Funding Agency

This project has received funding from the EU Horizon 2020 Research and Innovation programme: agreement No 101004730 and is supported by the Latvian Council of Science grant VPP-IZM-CERN-2020/1-0002.

Footnotes

I have read and accept the Privacy Policy Statement

Yes

Author: RATKUS, Andris (Riga Technical University)

Co-authors: LACIS, Viesturs (Riga Technical University); PIKURS, Guntis (Riga Technical University); Dr TORIMS, Toms (European Organization for Nuclear Research); GARION, Cedric (European Organization for Nuclear Research); KOS, Hendrik (European Organization for Nuclear Research); RORISON, Samuel (CERN); GRU-BER, Samira (Fraunhofer IWS); LOPEZ, Elena (Fraunhofer IWS); PATIL, Abhijeet (Fraunhofer IWS); STEPIEN, Lukas (Fraunhofer IWS); VEDANI, Maurizio (Politecnico di Milano)

Presenter: RATKUS, Andris (Riga Technical University)

Session Classification: Thursday Poster Session

Track Classification: MC7: Accelerator Technology and Sustainability: MC7.T35: Advanced Manufacturing Technologies for Accelerator Components