

Unbalanced Cylindrical Magnetron for Accelerating Cavities Coating

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Abstract : We report in this paper the design and qualification of a cylindrical unbalanced magnetron source. The dedicated magnetic assemblies were simulated using a finite element model. A hall-effect magnetic probe was then used to characterize those assemblies and compared to the theoretical magnetic profiles. These show a good agreement between the expected and actual values. The qualification of the different magnetic assemblies was then performed by measuring the ion flux density reaching the surface of the sample to be coated using a commercial retarding field energy analyzer. The strongest unbalanced configuration shows an increase from 0.016 A.cm^{-2} to 0.074 A.cm^{-2} of the ion flux density reaching the sample surface compared to the standard balanced configuration for a pressure 5.10^{-3} mbar and a plasma source power of 300 W.

Keywords : ion energy distribution function, magnetron sputtering, niobium, unbalanced, SRF cavities, thin film

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