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First HIPIMS tests for superconducting Niobium filmsWil Vollenberg¹, Sergio Calatroni², Anna Gustafsson²¹CERN-TS-VSC, Geneva 23, Switzerland ²CERN-TE-VSC, Geneva 23, Switzerland

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Niobium films are widely used at CERN for the coating of superconducting cavities. The performances of these cavities are highly influenced by the thin film properties. High Power Impulse Magnetron Sputtering (HIPIMS) gives new opportunities for conventional magnetron sputtering equipment. It can generate dense plasma with high target material ion content. The ion flux to the work piece can be used as a parameter for tuning the film properties. Reported peak power densities range from 1 – 3 kW/cm², with discharge voltages between 500 – 2000 V. Pulses up to 200 μs with a repetition frequency up to 500 Hz are used.

The aim of this study is to compare the superconducting properties of Niobium films made by conventional DC magnetron sputtering, with Niobium films made by HIPIMS. A commercial available Power Supply is used with a 150 mm planar magnetron source. The films are characterized by measuring TC, Residual Resistivity Ratio and morphology, either on quartz or copper substrates. X-ray diffraction is used to study the texture of the coatings. Working gas content of the coated layers will be measured by laser ablation.

First results of Niobium coatings will be presented.

Keywords

HIPIMS

niobium coatings

superconducting cavities