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Thermal and structural analyses of a VHF gun at Tsinghua University

Tuesday, 9 May 2023 16:30 (2 hours)

In this paper, a cooling scheme was designed for the THU VHF gun, and simulations of thermal and structural analyses were conducted. A total of 19 independent cooling channels were designed and distributed on the gun to remove the heat generated. The maximum temperature was 67.8 ℃ with a total flow rate of 3.28 L/s and dissipation power of 92.5 kW. The accelerating gap distance decreased by 124 um when heat and vacuum loads were applied. The tuning efficiency was 2.075 kHz/kN, and the maximum stress was 65.2 MPa. It is safe to conclude that the cooling scheme of the THU VHF gun meets the thermal and structural requirements and shows good properties in the temperature, deformation, and stress distributions. Future publications will thoroughly discuss the recent progress of the THU VHF gun.

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Footnotes

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