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A novel inductive oven design for the production of high current, metal ion beams

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Essential to the proposed search for element 120 at LBNL's 88-Inch Cyclotron is the continual delivery of over a particle microamp of $^{50}\text{Ti}^{12+}$ for weeks-long campaigns spanning many months. The fully-superconducting ECR ion source VENUS will be the injector source for these runs, and we have developed a new inductive oven design that can survive VENUS's high magnetic fields while injecting metallic gas into the plasma with high efficiency. The new oven employs a vertical susceptor to permit use with metals that melt before outgassing sufficiently, while also allowing a rotation of the oven's material exit toward the plasma center for better conversion efficiency to the produced beam. The performance of VENUS with this oven has been outstanding: as reported here, 282 MeV $^{50}\text{Ti}^{12+}$ beams with stable currents between 1.0 and 1.5 μA have been delivered for superheavy element searches over multiple ten-day runs.

Footnotes

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Yes

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