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The Design of a 2.45 GHz Microwave Ion Source for a High-Efficiency, High-Resolution Isotope Separator

Due to the rapid development of applications of nuclear science and technology in China, the production capacity of isotopes cannot meet the growing demands. Therefore, the development of electromagnetic isotope separator with high yield and high isotopic purity is needed. An electromagnetic isotope separator based on a 2.45 GHz microwave ion source and high-resolution magnet has been developed to study a number of important heavy isotopes, such as Xenon and molybdenum isotopes. The ion source is expected to produce 20 emA Xe⁺ and 10 emA Mo⁺ respectively. To achieve this goal, series of technical difficulties need resolving, such as metal vapor damage of the microwave window, design of the special-shaped discharge chamber and precise control of the oven temperature. In the paper, the physical simulation and technical design of the microwave ion source are presented.

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