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DONES Accelerator Design and Beam Physics

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The IFMIF-DONES facility aims to generate a high flux of 14 MeV neutrons (up to $10^{18} \text{ n m}^{-2} \text{ s}^{-1}$) to enable the characterization and qualification of materials for future fusion reactors. To accomplish this, it will use a continuous-wave (CW) linear accelerator delivering a 125 mA deuteron beam at 40 MeV onto a liquid lithium target. This configuration presents a unique challenge, combining unprecedented beam intensity, high beam power (5 MW), and strong space-charge effects.

This paper presents the beam physics concepts and methodologies developed for the design and simulations of the DONES accelerator. The simulation results, including start-to-end modeling, are presented and discussed in detail.

Footnotes

Funding Agency

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Yes

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