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Electron cyclotron resonance accelerator for industrial radiation processing

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Industrial radiation processing is used on a wide variety of products, including medical devices for eradication of pathogens, food for preservation and safety, and plastics for material property modification. But millions of curies of Co-60 that are still used in some industrial sterilization facilities can pose a significant security risk in an act of radiological terrorism. Lower-cost electron beam systems with high beam-power efficiency and high reliability are needed to replace Co-60 based sterilization systems. A novel accelerator under development, electron Cyclotron Resonance Accelerator (eCRA) is described here. It is highly compact and efficient to produce high power electron beams and x-ray beams. The several attractive features of eCRA include: a compact robust room-temperature single-cell RF cavity as the accelerator structure; continuous ampere-level high current output without bunching; and a self-scanning accelerated energetic e-beam, obviating need for a separate beam scanner. Details of design and predicted performance will be described.

Footnotes

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