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Design of an S-band buncher for KeV UED

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High power input often leads to frequency deviation that cannot meet the high-precision frequency control requirements of keV Ultrafast Electron Diffraction (UED) compression cavities. In this paper, we propose new solutions for reducing heat generation and frequency deviation based on modifications to the cavity design and power input method, building upon the design of the original elliptical cavity. These solutions have been verified through simulation calculations. In pulsed input mode, the cavity temperature rise is within 2°C, and in continuous wave mode, the new cavity design can withstand temperature rises of up to 20°C, both of which meet the requirements of practical engineering.

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Footnotes

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