

Peer Review

Review of: "A Computer Simulation Study on Ion Optics Aiming at the Realization of Projection-Type Mass Spectrometry Imaging"

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The research article “A Computer Simulation Study on Ion Optics Aiming at the Realization of Projection-Type Mass Spectrometry Imaging” presents a technically detailed and scientifically valuable simulation-based investigation addressing the feasibility of projection-type mass spectrometry imaging using minimal modification of commercially available TOF-MS instrumentation. The study demonstrates strong methodological rigor through extensive SIMION simulations, systematic evaluation of PED parameters, and comprehensive exploration of ion trajectory behavior across multiple mass ranges, which significantly contributes to instrumentation development and theoretical optimization of high-resolution MSI. However, the manuscript shows several limitations, including its heavy reliance on computational modeling without experimental validation, limited discussion on potential real-world hardware constraints such as detector sensitivity and signal-to-noise performance, and reduced accessibility due to highly dense technical descriptions without sufficient schematic summarization. Additionally, statistical uncertainty analysis, reproducibility discussion, and comparison with alternative ion optics optimization strategies could further strengthen the study’s robustness. The article would benefit from integrating preliminary experimental verification, clearer conceptual diagrams summarizing optimization workflows, and expanded discussion on translational applications in biomedical or materials science imaging.

Declarations

Potential competing interests: No potential competing interests to declare.