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An AI dose engine for fast carbon ion treatment planning

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Ion beam therapy is the most advanced form of radiotherapy, requiring fast, precise, and accurate treatment planning. Speed is a critical factor for cancer patients, as timely interventions can significantly impact outcomes. While Monte Carlo simulations offer high-quality dose calculations, they are too slow for routine clinical workflows. In contrast, analytical pencil beam algorithms deliver faster results, but at the cost of some accuracy. We leverage the Dose Transformer Algorithm (DoTA) [DOI:10.1088/1361-6560/ac692e] to predict input data for the biological effects of carbon ion beams, aiming to achieve Monte Carlo-level quality with a speed comparable to the analytical approach.

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