

GENERATION OF QUASI-MONOENERGETIC POSITRONS BASED ON LASER WAKEFIELD-ACCELERATED ELECTRONS

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Great progress has been made on laser wakefield accelerators (LWFA), more than 4 GeV electron beam from LWFA has been reported recently. Such energetic electron beam from LWFA is proposed to produce energetic positrons recently. A new scheme for generating energetic positron beam by irradiating LWFA (Laser wakefield Accelerator) electrons on solid targets is studied both theoretically and experimentally. In our simulations, the process is studied by both PIC code PLASIM and Monte-Carlo Code Fluka. Based on our simulations, corresponding experiments has been designed and conducted on the 200 TW laser facility in Shanghai Jiaotong University. Here, we report on the generation of 76 MeV quasi-monoenergetic positron beam with root-mean-square energy spread of 12% from a laser wakefield accelerated electrons irradiating on a copper target by optimizing experiment layout, which is crucial for the generation of quasi-monoenergetic positron beam. Simulation results are in good agreement with the experimental ones. The energetic quasi-monoenergetic table-top positron sources obtained in our experiments will offer an effective tool in the applied and fundamental research.