

Optimization of Transmission X-ray Target for Intense Pulsed Electron Beam Accelerators

Xiao Yu ¹, Shijian Zhang ^{2,3,4,5}, Ivan Sergeevich Egorov ⁵, Jiangqi Zhao ^{2,3,4}, Chang Xiong ^{2,3,4}, Sha Yan ¹, Chang Tan ⁶, Gennady Efimovich Remnev ^{2,5}, Xiaoyun Le ^{2,3,4 *}

¹ State Key Laboratory of Nuclear Physics and Technology, Institute of Heavy Ion Physics, Peking University, Beijing 100871, PR China; yurii@pku.edu.cn; changxiong@buaa.edu.cn;

² School of Physics, Beihang University, Beijing 100191, PR China; zhangsj@buaa.edu.cn; 17377364@buaa.edu.cn; changxiong@buaa.edu.cn;

³ Beijing Advanced Innovation Center for Big Data-Based Precision Medicine, School of Medicine and Engineering, Beihang University, Key Laboratory of Big Data-Based Precision Medicine (Beihang University), Ministry of Industry and Information Technology, Beijing, 100191, PR China;

⁴ Beijing Key Laboratory of Advanced Nuclear Energy Materials and Physics, Beihang University, Beijing 100191, PR China;

⁵ National Research Tomsk Polytechnic University, Tomsk 634050, Russia; egoris@tpu.ru; remnev06@mail.ru;

⁶ Shaanxi Key Laboratory of Plasma Physics and Applied Technology, Xi'an Aerospace Propulsion Institute, Xi'an 710100, PR China; casc_tan@163.com;

* Correspondence: xyle@buaa.edu.cn;

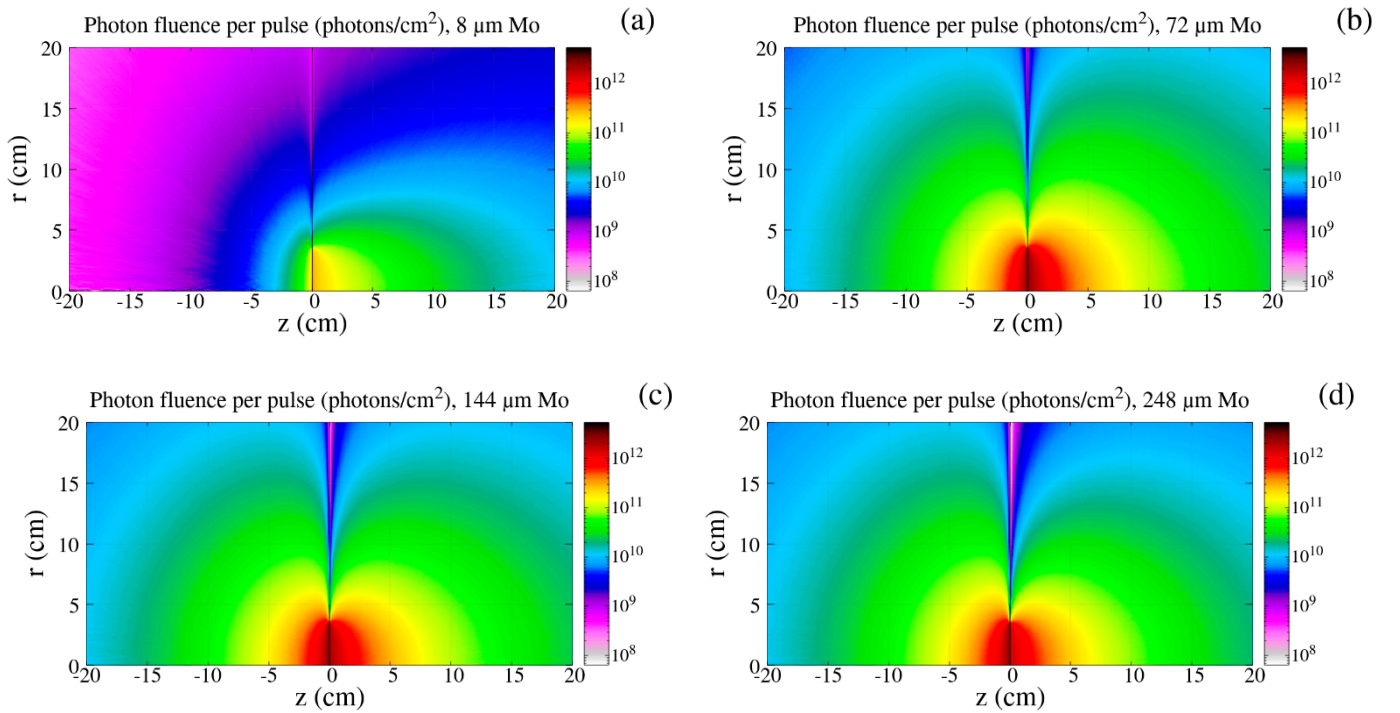


Figure S1. Spatial distribution of photon fluence by per IPEB pulse on molybdenum target with thickness of (a) 8 μm , (b) 72 μm (the optimal target thickness), (c) 144 μm (2 times of the optimal target thickness), (d) 248 μm (CSDA range).

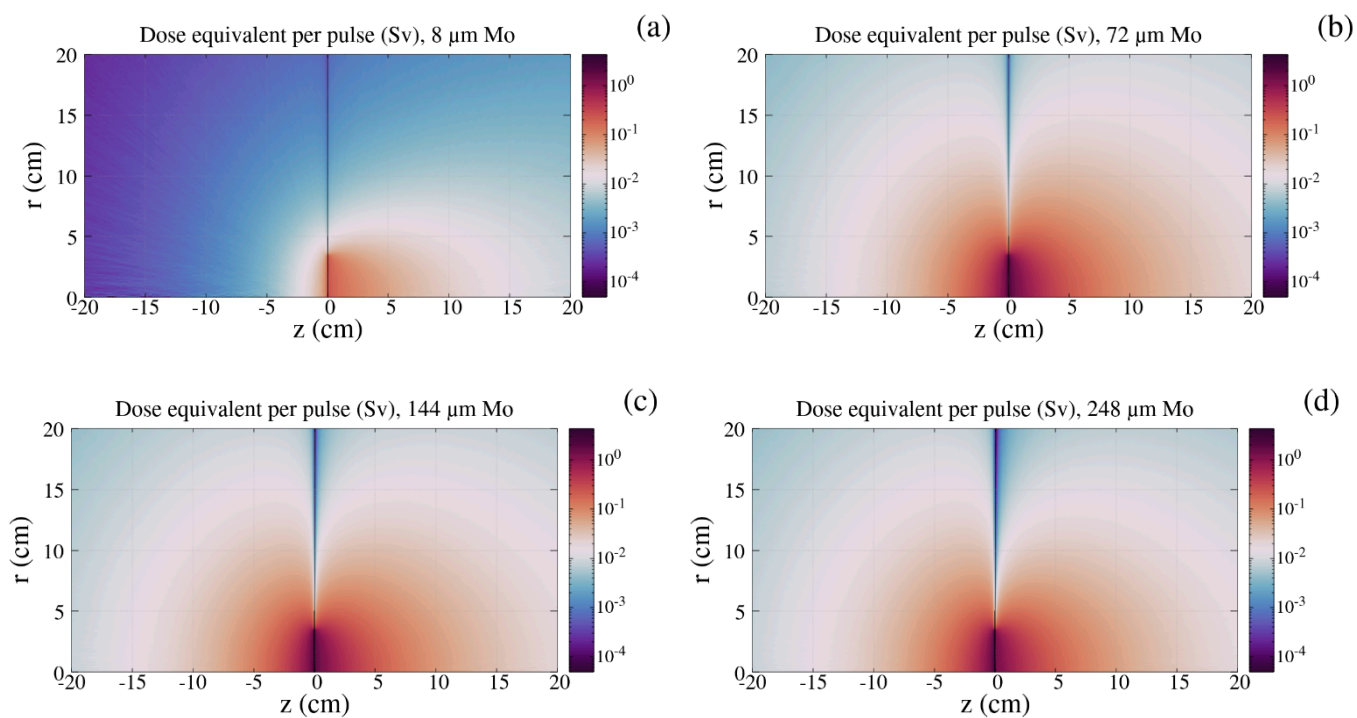


Figure S2. Spatial distribution of dose equivalent by per IPEB pulse on tungsten target with thicknesses of (a) 8 μm , (b) 72 μm (the optimal target thickness), (c) 144 μm (2 times of the optimal target thickness), (d) 248 μm (CSDA range).

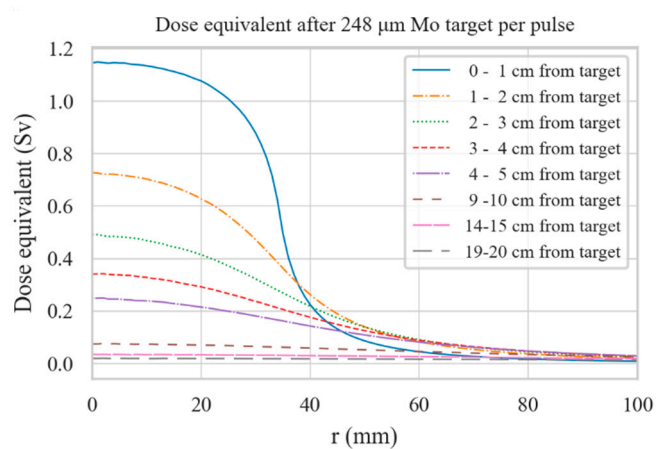


Figure S3. Dose equivalent distribution per IPEB pulse on molybdenum target with the thickness of CSDA range.

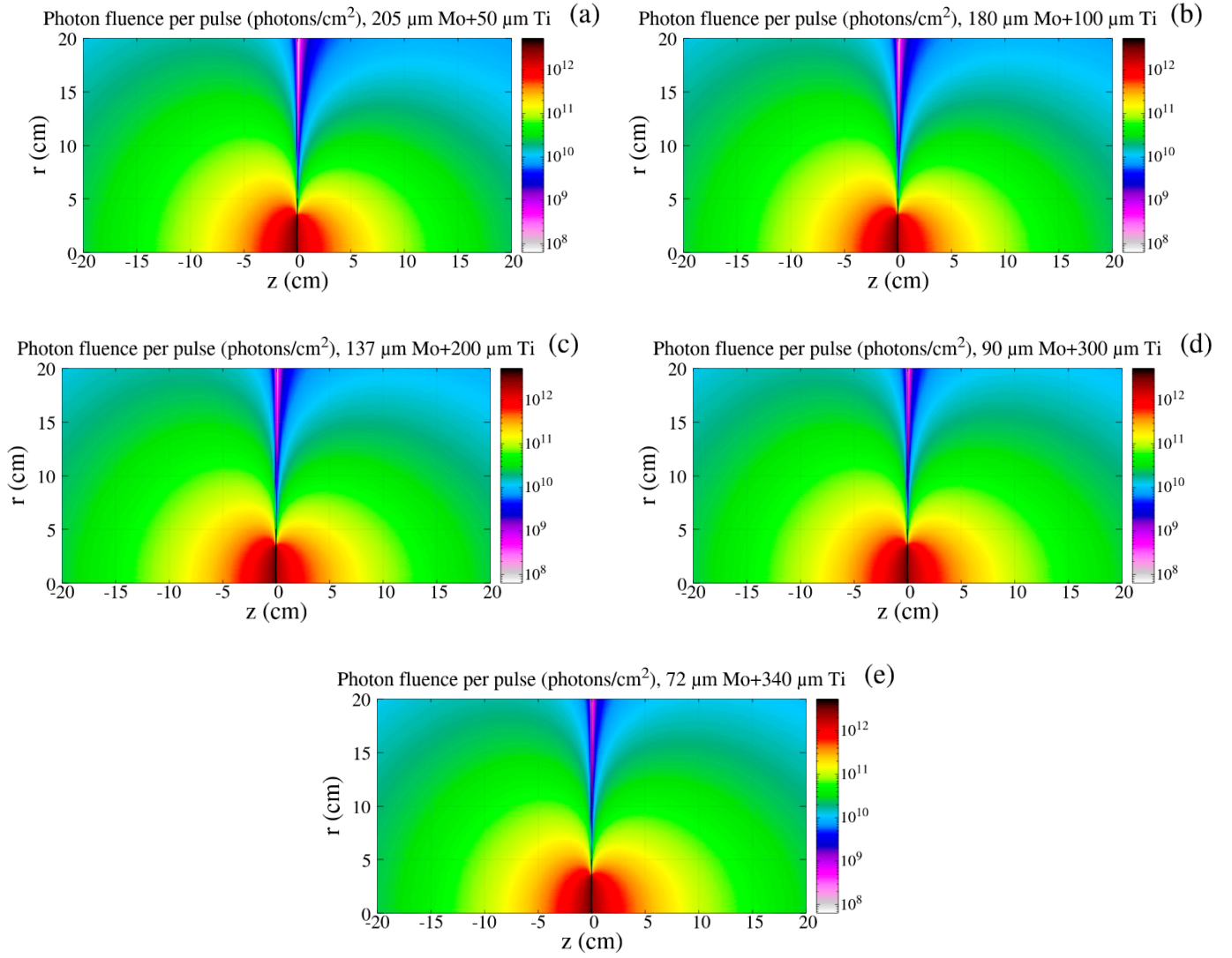


Figure S4. Spatial distribution of photon fluence by IPEB on molybdenum-titanium dual-layer target with thicknesses combination (subfigure a-e corresponding to the duplicate item titles in Table 2).

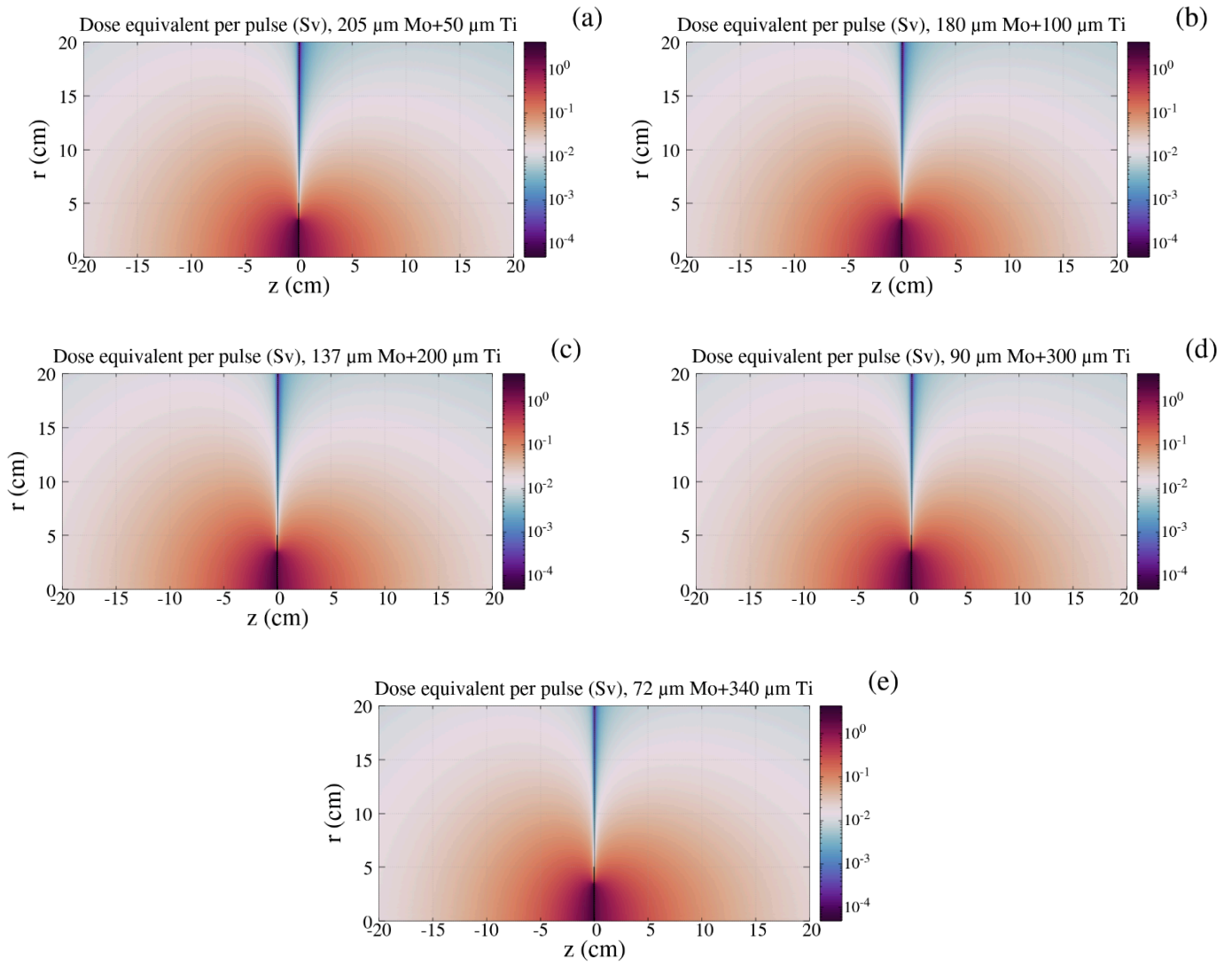


Figure S5. Spatial distribution of dose equivalent by IPEB on molybdenum-titanium dual-layer target with thicknesses combination (subfigure a-e corresponding to the duplicate item titles in Table 2).

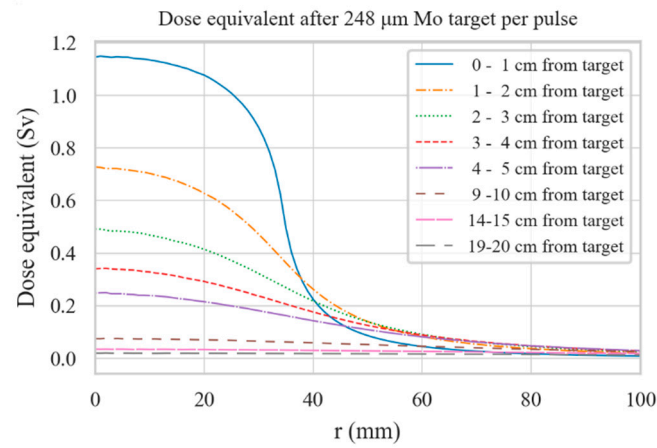


Figure S6. Dose equivalent distribution per IPEB pulse on dual-layer targets with parameters of Table 4e.

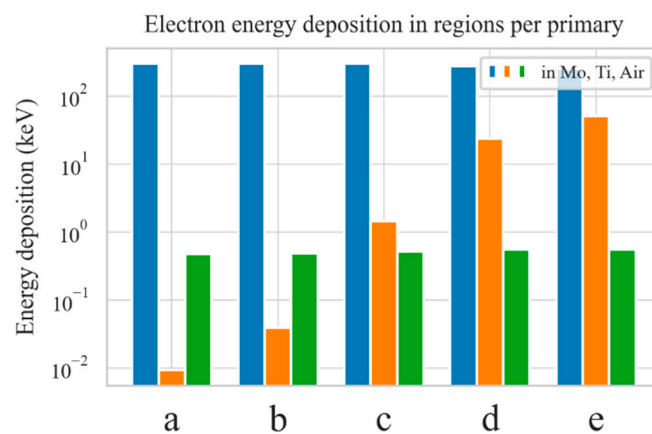


Figure S7. Electron energy deposition in different regions with parameters in Table 2.