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P2.2030 Optimization of gamma-ray source driven by picosecond laser using gold foams

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See the full abstract here
http://ocs.ciemat.es/EPS2019ABS/pdf/P2.2030.pdf

Experiments and numerical simulation show that -ray radiation can be effectively enhanced with gold foam through a new mechanism. As shown in Fig.1and Fig.2, the intensity laser can enter into the high density reign which is close to the foam's bubble cavity region due to the "hole boring "effect. The reflux cold electrons mainly move along the bubble wall due to the sheath electric field (E) in the bubble. Thus a strong positive current is formed at the bubble wall, producing a 100 trillion Gauss magnetic field (B). Then a magnetic barrier is formed, which plays the role of energy selection: high-energy electrons can pass through the foam while the low energy electrons will be kicked back into the laser field to gain energy again, until electrons have enough energy to overcome the "magnetic barrier". Therefore, foam can significantly change the relativistic electrons spectrum, increasing the proportion of high-energy electrons, and enhancing the efficiency of -ray production.

Fig.1 2D PIC numerical simulation results about relativistic electrons in foam target;

Fig.2 Experimental results of -ray spectrum and spatial distribution between planar target and foam target;

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