

Study of gamma-rays produced by intense laser interactions with low density foams using nuclear diagnostic

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In the recent experiment carried out in September 2019 in PHELIX laser facility in Darmstadt, Germany, the interaction of relativistic laser pulse with different targets namely low density CHO foams, high-Z foils and high Z-radiators was investigated.

Using different diagnostic tools especially electron-spectrometers in different angles, TLD-spectrometers and nuclear samples, it was possible to determine electron spectra, measure dosis and evaluate the gamma spectra by means of photonuclear reactions.

Photonuclear were observed and quantified in Cr, In, Ta and Au samples. These Samples were placed in different angles relative to target and the reactions yields were determined by HPGe gamma spectrometry. The results show activation products as ^{194}Au a (g, 3n) reaction using CHO foam in combination of gold as radiator, requiring gamma rays exceeding 23 MeV in energy. In addition this method was also used to determine reaction yields caused by thermal and fast neutrons.

Primary author: Ms TAVANA, Parysatis (Goethe University)

Co-authors: GÜNTHER, Marc (GSI, Darmstadt); ZAHN, Nadiya; ROSMEJ, Olga (GSI, Darmstadt); ZÄHTER, Sero (Goethe-Universität Frankfurt(UFfm-IAP))

Presenter: Ms TAVANA, Parysatis (Goethe University)

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