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Spatial and pulse shape dependence of Kα source from high contrast fs laser plasmas in regime of Relativistic Engineering LIMING CHEN, Advanced Photon Resaerch Center, Japan Atomic Energy Agency — Interaction of intense Ti: Sapphire laser with Cu foil targets has been studied by measuring hard X-ray generation. Hard x-ray spectroscopy and Kα X-ray conversion efficiency (η_K) from Cu plasma have been studied as a function of laser intensity via pulse duration scan ($60\ fs \sim 600\ fs$), laser pulse energy scan ($60\ mJ \sim 600\ mJ$) and target displacement scan from best focus. For intensity $I > 1x10^{17}\ W/cm^2$, the Cu η_K keep on increasing to reach a maximum value of $1x10^{-4}$ at an intensity $I = 1x10^{18}\ W/cm^2$. The focusing was varied widely to give a range of intensities from $10^{15}\ W/cm^2 \sim 10^{18}\ W/cm^2$. Two individual emission peaks are obtained, one is at best focal spot and the other is at larger target offset corresponding to $\sim 10^{15}\ W/cm^2$. Each peak is corresponding to different energy absorption mechanism. In addition, when we introduce slightly detuning of compressor gratings at the best focal condition, it shows η_K generated by negatively skewed *100 fs* pulse width laser irradiation reach $5x10^{-4}$ and almost 7 times greater than the case of positively skewed pulse. Vacuum Heating is greatly stimulated in this case and preciously control of pre-plasma is the key factor in tuning control of X-ray emission in relativistic *fs* regime.

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