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Experimental results of the quasi-monoenergetic electron beam generation from the self-modulated laser wakefield acceleration using a pinhole-like collimator HYYONG SUK, NASR HAFZ, HYOJAE JANG, CHANGBUM KIM, GUANGHOON KIM, KERI, CENTER FOR ADVANCED ACCELERATORS TEAM — We report recent results from the self-modulated laser wakefield acceleration experiment that has been carried out at KERI (Korea Electrotechnology Research Institute), For this experiment, we used a 3 TW Nd:glass/Ti:sapphire hybrid laser system that can deliver an energy of 2.1 J with a pulse duration of 700 fs. In the experiment, the high power laser beam is focused to a beam size of $\sim$ 10 microns in the supersonically ejected He gas jet (density$\sim$10$\hat{1}$9 cm$\hat{}$3) by a parabolic mirror. The strong laser-plasma interaction led to production of MeV-level high energy electrons up to $\sim$10 MeV. We used a pinhole-like collimator with a diameter of 1 mm to select only high energy electrons that propagate along the axis. In this way, we could obtain quasi-monoenergetic high-energy electrons. Detailed beam and plasma parameters were measured by using several diagnostic tools including an ICT for charge measurement, dipole magnet/lanex film for energy and energy distribution, spectrometer for plasma density from the Raman scattered laser beam, etc. In this presentation, detailed experimental results are shown.

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