

Recent Progress of Laser Wakefield Acceleration Experiments at KEK/UNIV. TOKYO/JAERI, K. NAKAJIMA, H. NAKANISHI, A. OGATA, KEK; M. KANDO, Kyoto Univ.; H. HARANO, T. UEDA, M. UESAKA, T. WATANABE, Y. YOSHII, Univ. Tokyo; H. DEWA, S. KONDO, H. KOTAKI, JAERI - Recently there has been great interest in the laser-plasma accelerators promising a compact particle accelerator owing to ultrahigh gradient laser wakefield acceleration (LWFA). The LWFA experiments has been conducted by the use of 2 TW, 90 fs laser pulses synchronized with electron beams delivered by a 17 MeV RF linac. Preliminary experiments demonstrated energy gain more than 200 MeV in a few cm attributed to ionization-induced self-modulation and self-guiding of intense ultrashort laser pulses in plasmas. Interferometric measurements of plasma density oscillation and mesurements on the laser-plasma interaction supported enhanced electron acceleration by laser wakefields. Our current project is focused on developing the RF photoinjector and the bunch compressor to produce a low emittance femtosecond electron beam injected into a correct acceleration phase of the laser wakefield. The more high energy-gain acceleration of bunched electrons is expected via improved electron injectors and a capillary plasma wave guide. This paper reports recent results of LWFA experiments and developements.