

# Laser Accelerator Development at KPSI-QST

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In Kansai Photon Science Institute (KPSI), National Institutes for Quantum and Radiological Science and Technology (QST), we are developing laser-driven particle beams [1] for novel, compact sources including protons, heavy ions, and electrons as well as photon sources ranging from 100's eV to several MeV.

The ion acceleration study is based on target normal sheath acceleration (TNSA) by irradiating several hundreds TW laser pulses onto foil targets. By carefully adjusting contrast level of our laser system J-KAREN-P [2], the maximum proton energy reaches to ~ 50 MeV now (Mar. 2017) with a 2- $\mu$ m-thick Al target. We also improved the focal spot quality and the current strehl ratio measured on target is ~ 0.5 achieving ~ $8.4 \times 10^{21}$  W/cm<sup>2</sup> [3].

The electron acceleration study is conducted using J-KAREN-P laser and a smaller system JLITE-X [4] at KPSI-QST. We are developing plasma and electron real time monitors and testing an electron acceleration with our J-KAREN-P laser. As for plasma monitors, we have developed sub-10-fs shadowgraph for direct plasma density modulation [5] and holography for interferometric measurement [6]. In addition, we have demonstrated characterization of pulse duration and timing of electron beams using electro-optic (EO) techniques [7].

## References

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