



Contribution ID: 82

Type: **Poster presentation**

Proton Production by a Laser Ion Source with Hydride Targets

Monday 16 October 2017 18:45 (15 minutes)

There has been considerable research in proton beam production with laser-produced plasma, due to its important applications in various fields, such as cancer therapy and neutron source for radiography. While the feasibility of a laser ion source as the pre-injector of cancer therapy facilities in terms of the capability of the carbon ion beam production has been demonstrated in our previous research, there are still difficulties in intense proton beam production by a laser ion source. To investigate the capability of the proton production by a laser ion source, the hydride materials were used as the targets irradiated by a Nd:YAG laser ($\lambda=1064$ nm, $\tau=5\sim 10$ ns) in this research. The results will be presented and discussed here, including the yields and energy distributions of the proton beams, and their dependences on the laser parameters as well.

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Session Classification: Poster Session 1

Track Classification: Production of high intensity ion beams