Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Improved theory for relativistic transmittance of circularly polarized laser pulses in non-ideal, realistic plasmas[1] TEYOUN KANG, YOUNGKUK KIM, MIN SUP HUR[2], Ulsan Natl Inst of Sci Tech — Owing to the rapid development of laser technologies, relativistically-induced transmittance (RT) of ultra-intense laser pulses in overdense plasmas is now a practically important matter. RT could give either deleterious or positive effects depending on the kinds of laser-plasma interactions. In radiation-pressure-acceleration (RPA), enhanced transmittance lowers the momentum transfer from the pulse to the ions. Meanwhile, in collisionless-electrostatic-shock, the acceleration efficiency can be increased owing to the effective heating of upstream electrons by transmitted laser fields. Previous theories mostly have handled RT in ideal plasmas, such as an infinitely long uniform plasma or a delta-function-like slab. In the actual applications, however, RT is generally combined with other dynamics, such as plasma density compression, leading to RT under a plasma in other cases. We developed one-dimensional RT theories for circularly polarized laser pulses, which would be used for such realistic plasma profiles. According to our theory, optimal thickness condition should be modified in RPA. Furthermore we developed our theory so that RT in the common two-step density plasma can be modeled. In this poster, we present the derivation and the comparison of the improved theory with PIC simulation results.

[1]This work was supported by the Basic Science Research Program (Grant number NRF-2013R1A1A2006353).
[2]Corresponding author. E-mail: mshur@unist.ac.kr

Teyoun Kang
Ulsan Natl Inst of Sci
Tech

Date submitted: 12 Jul 2016 Electronic form version 1.4