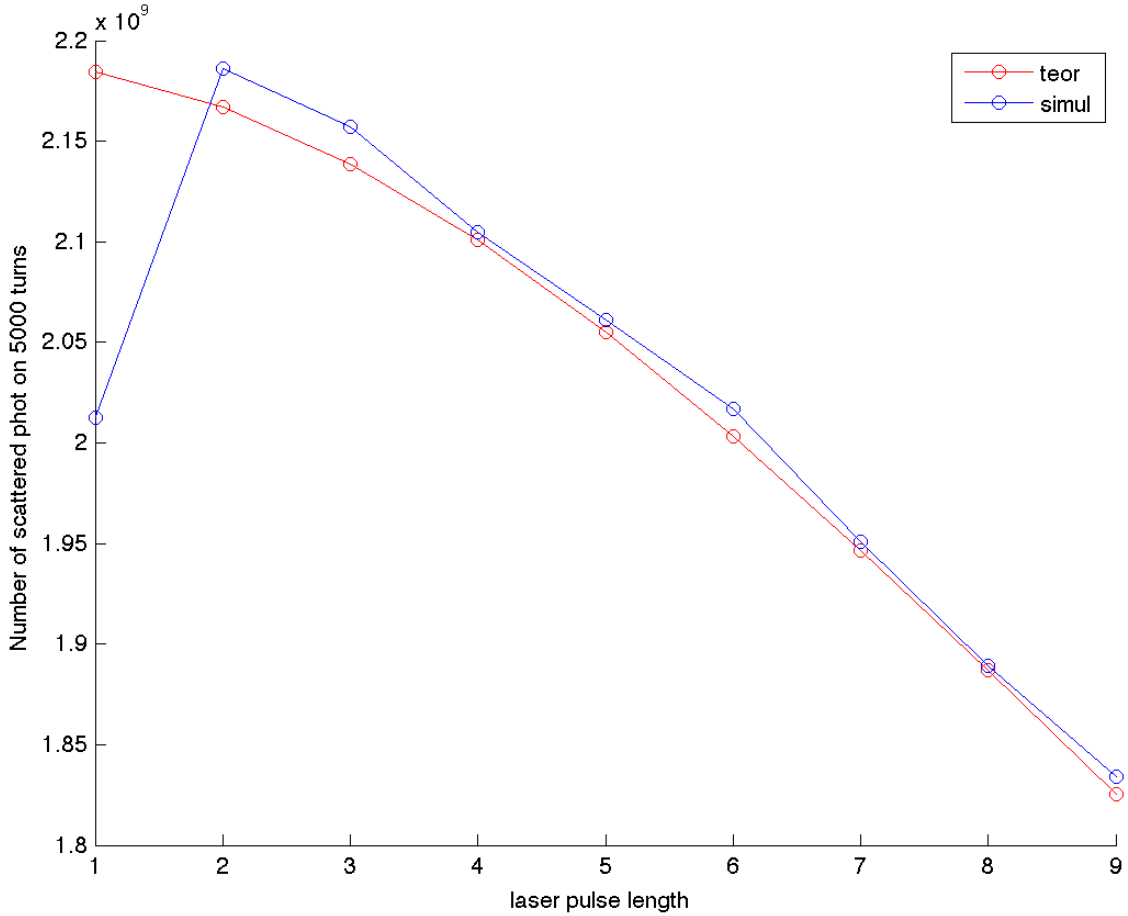
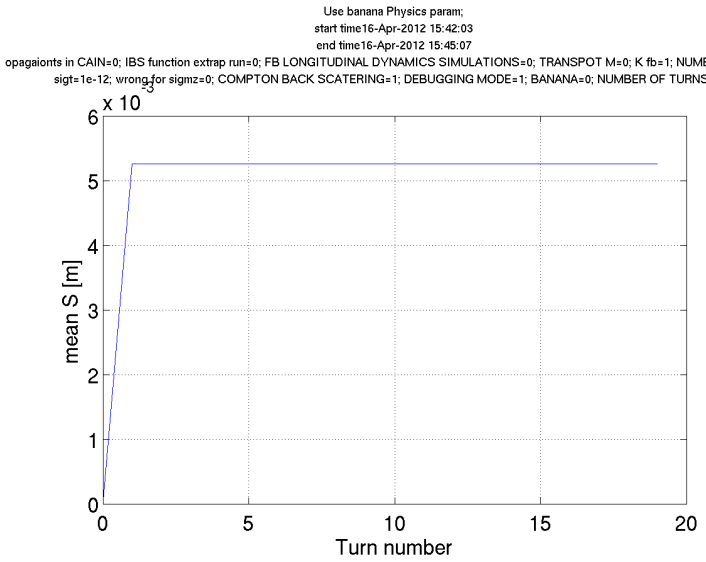
For using CAIN code for tracking simulations you can make some mistakes. Here represented some of them.

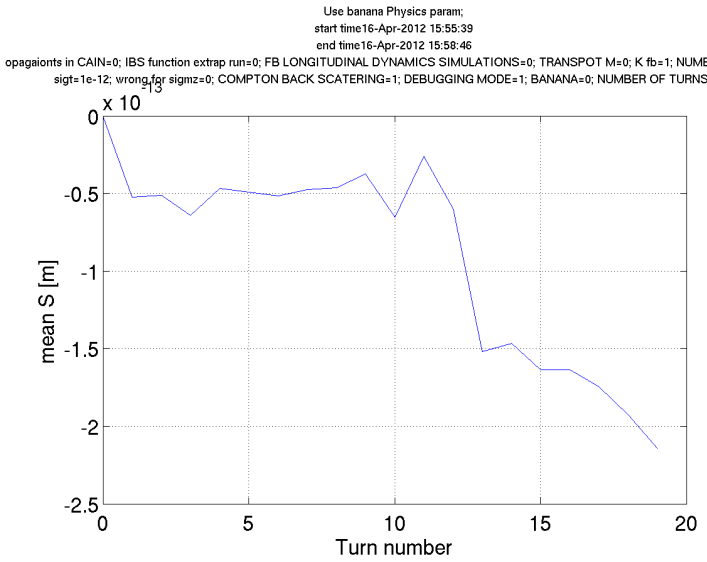
Illya DREBOT

First be careful with units length and time on cain code there both in meters. If bunch length for calculating propagation time (PUSH) will be in pico second This will have strong effect of flux from initial laser pulse length. that will not correspond with theoretical shape. Example of this effects represented on plot.



Another possible error. It's if you not compensate drift in in Cain simulations. It's mean that through CAIN simulations you electron beam will have longitudinal propagation what will equal to the time of interaction laser and electron beams in meter. To reduce this we use parameter in CAIN: DRIFT T=0;



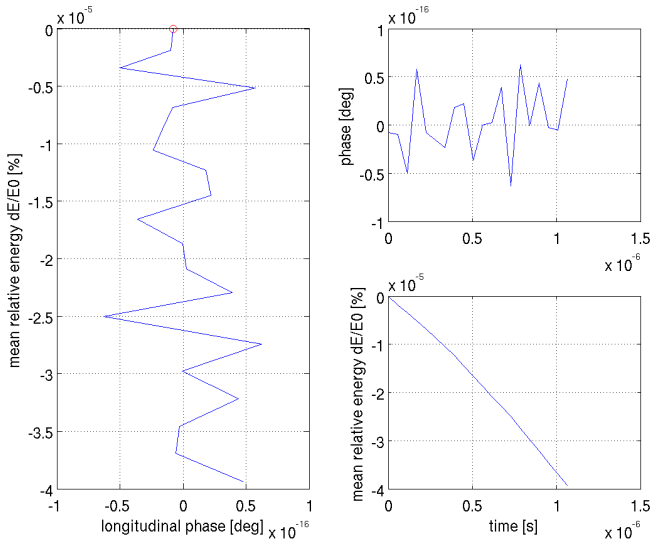


We see that without using DRIFT T=0; we have jump for mean S (longitudinal electrons coordinate) around 5 mm.

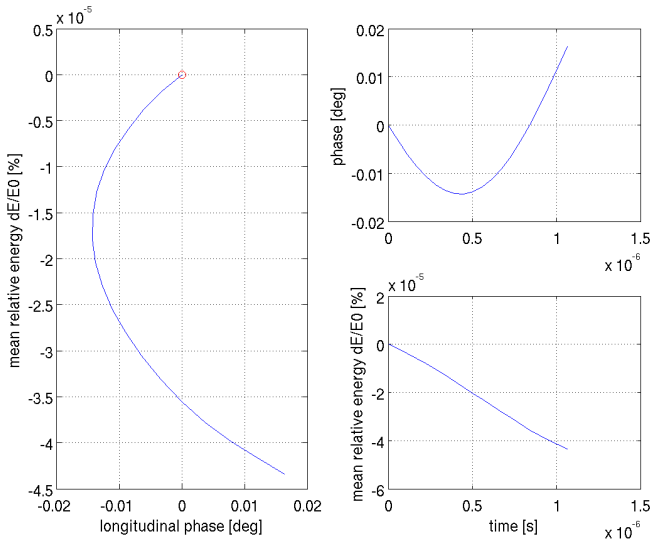
And completely wrong if you will make compensating propagation in CAIN using this action.

$Scoordinate(i) = Scoordinate(i) - mean(Scoordinate(allparticles))$

So as this action delete all longitudinal motions and oscillations during another simulations (LD, LD FB, Transport matr.).

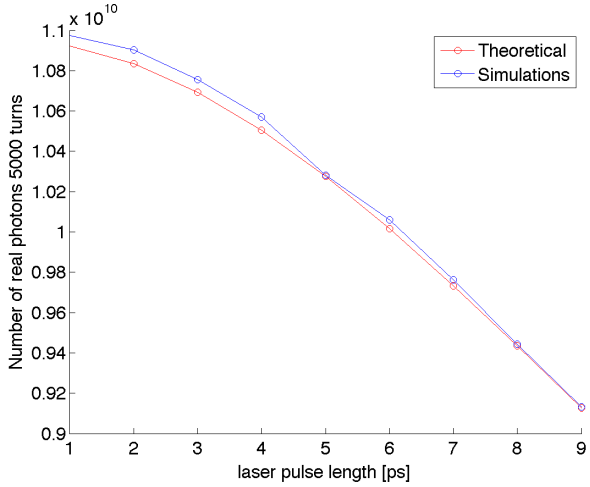


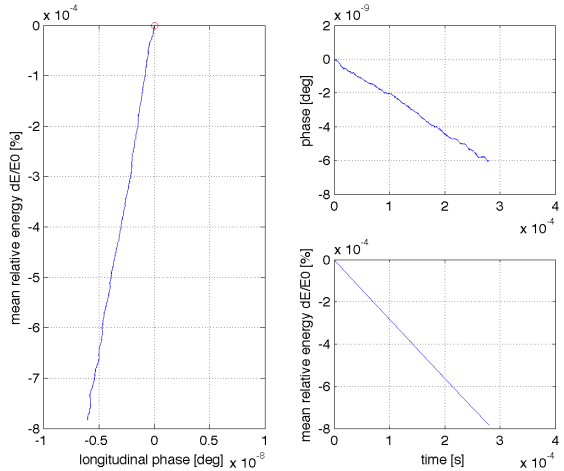
Wrong propagation



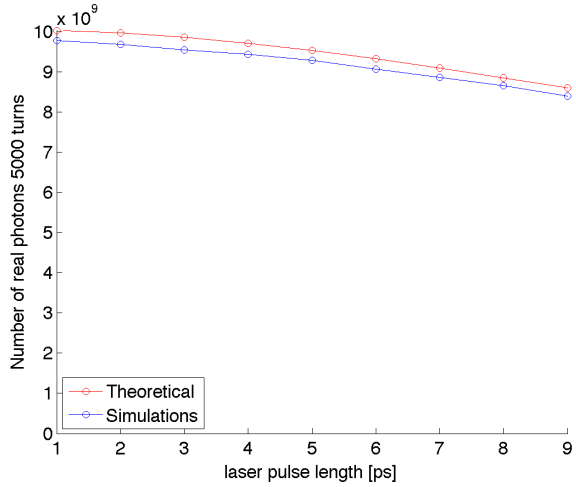
Correct propagation

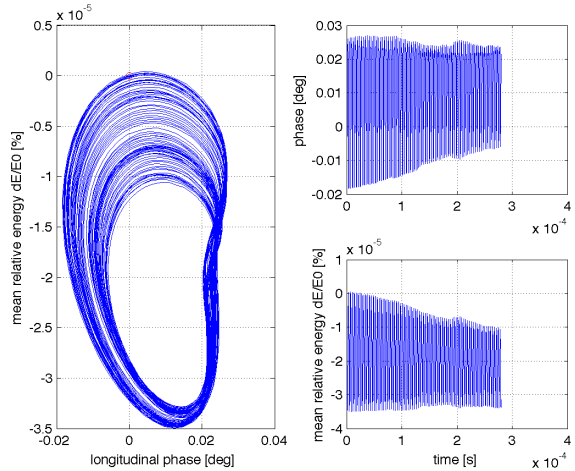
If you not made mistake what we revue early you well have good agreement theoretical and simulations calculations.





Without longitudinal motions





With longitudinal motions