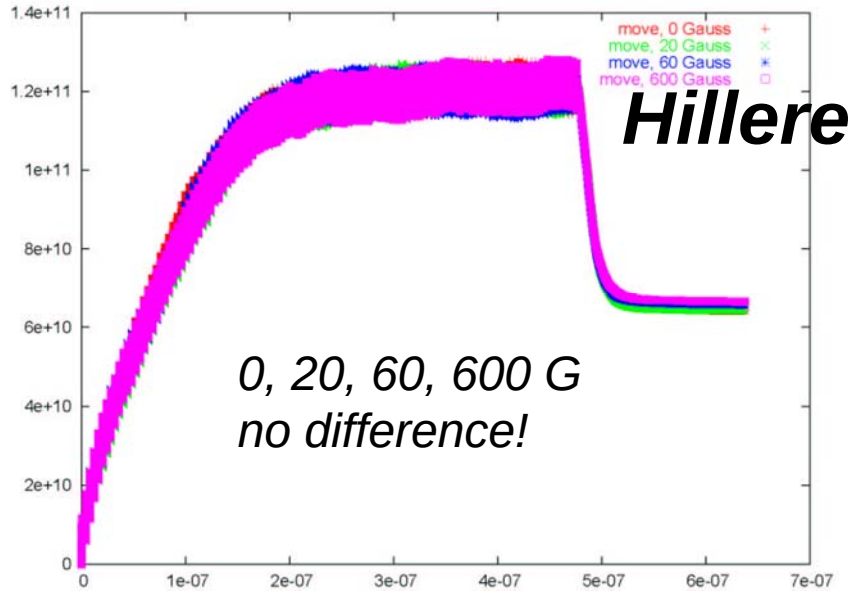
e-cloud benchmarking

simulations for KEKB: different integration routines yield the same result; there is only a moderate dependence on the elastic e- reflection model

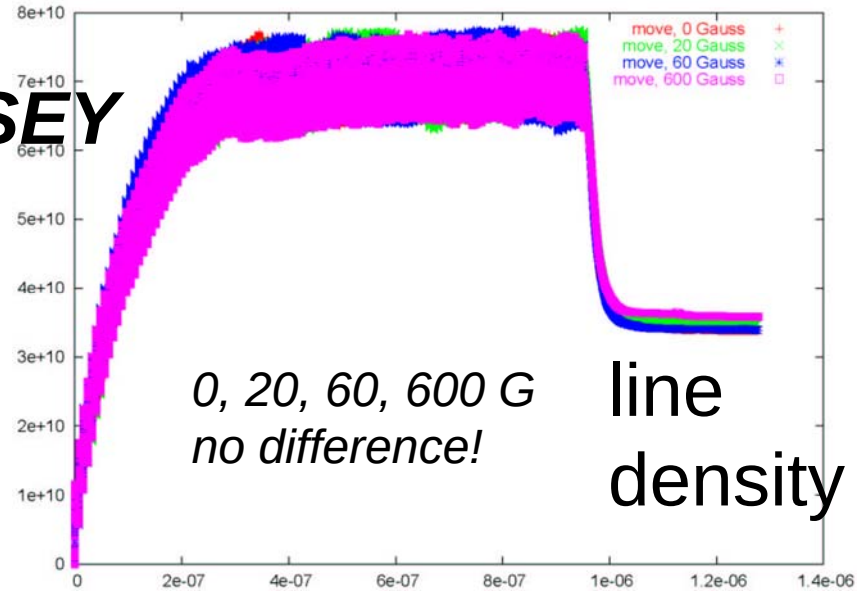
simulations for ILC DR: there is an enormous dependence!! (bug?)

# *simulation for combined quadrupole and solenoid*




***Hilleret SEY***

*0, 20, 60, 600 G*
*no difference!*

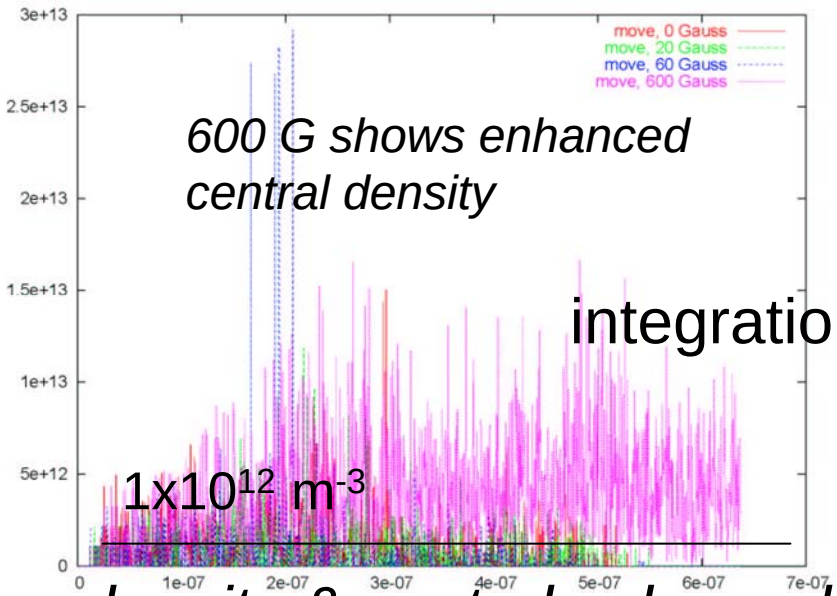



*0, 20, 60, 600 G*
*no difference!*

line density

2 buckets spacing

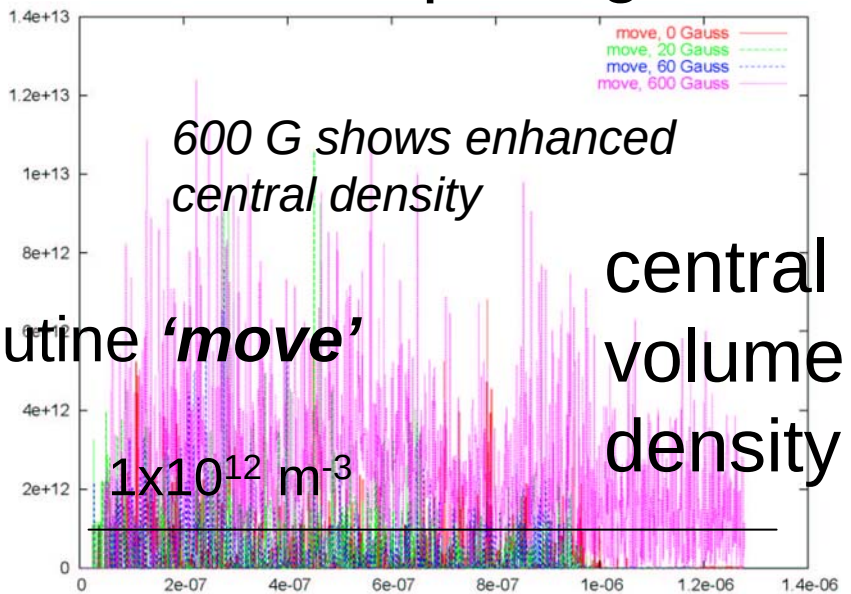
4 buckets spacing




*600 G shows enhanced central density*

$1x10^{12}$ $m^{-3}$

integration routine ***'move'***



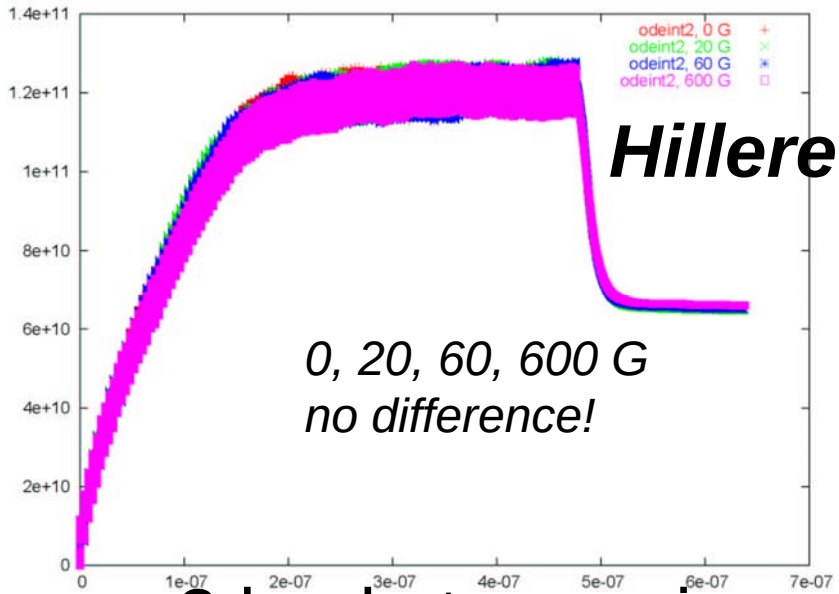

*600 G shows enhanced central density*

$1x10^{12}$ $m^{-3}$

central volume density

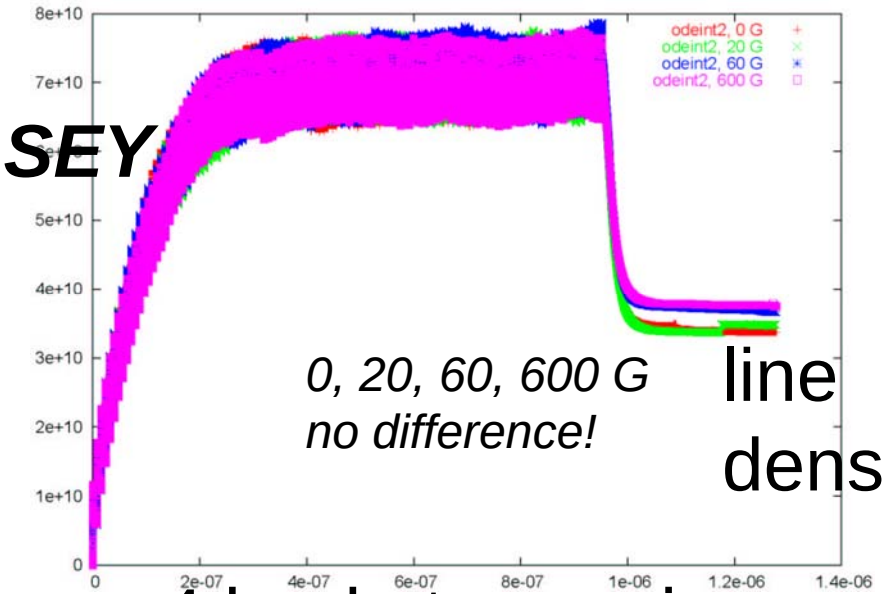
*line density & central volume density not reduced by solenoid field!*

# *simulation for combined quadrupole and solenoid*




***Hilleret SEY***

*0, 20, 60, 600 G*
*no difference!*

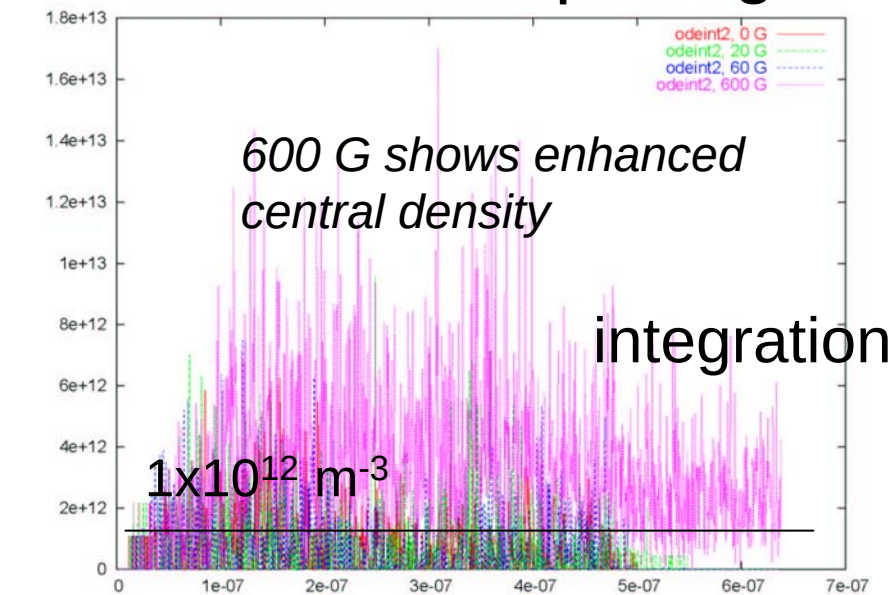



*0, 20, 60, 600 G*
*no difference!*

line density

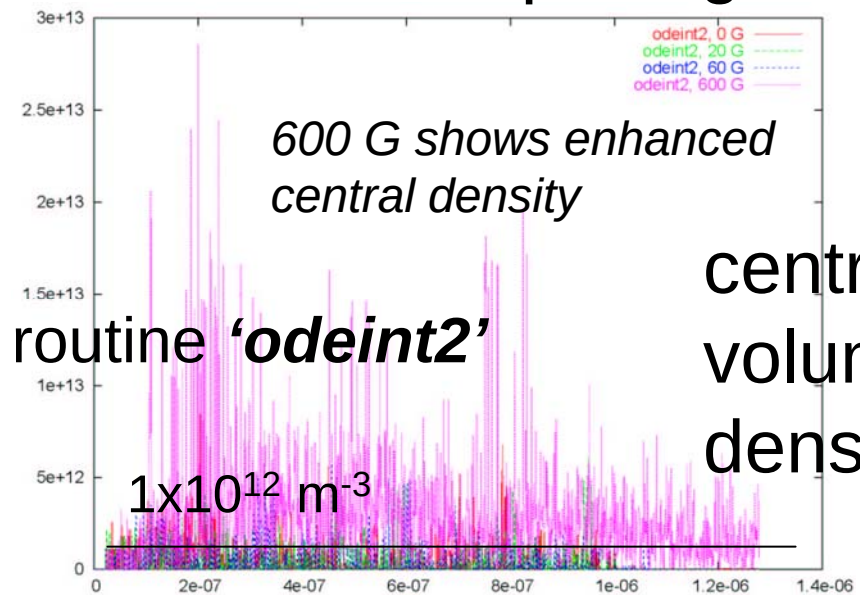
2 buckets spacing

4 buckets spacing




*600 G shows enhanced central density*

integration routine ***'odeint2'***

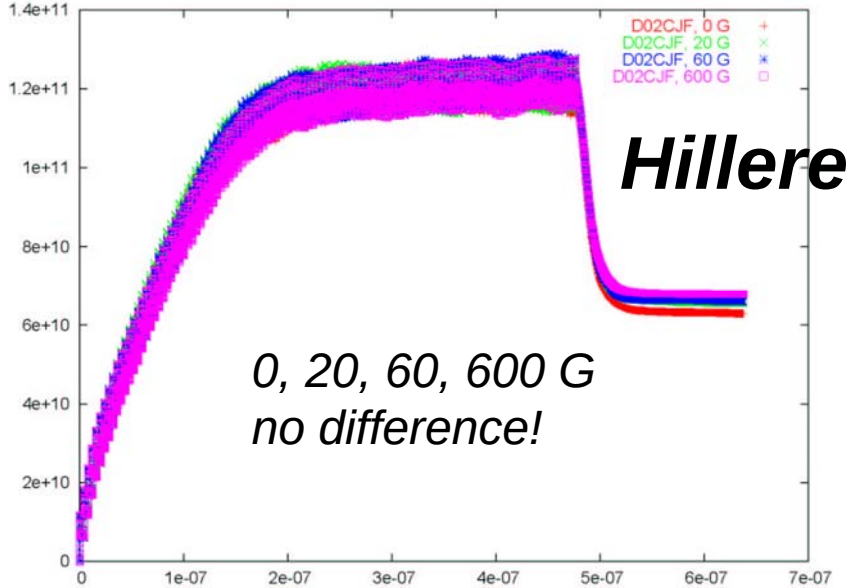



*600 G shows enhanced central density*

central volume density

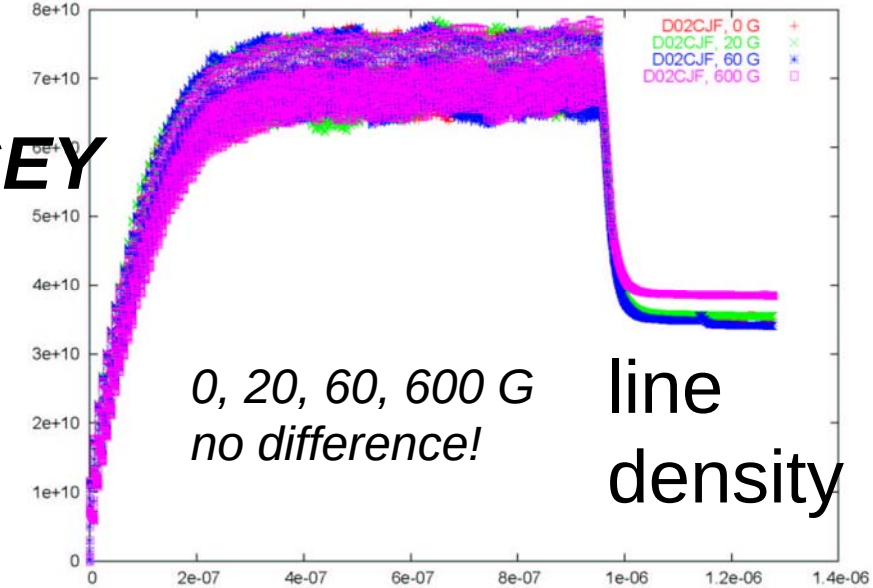
*results almost identical to the 'move' tracking routine*

# *simulation for combined quadrupole and solenoid*




***Hilleret SEY***

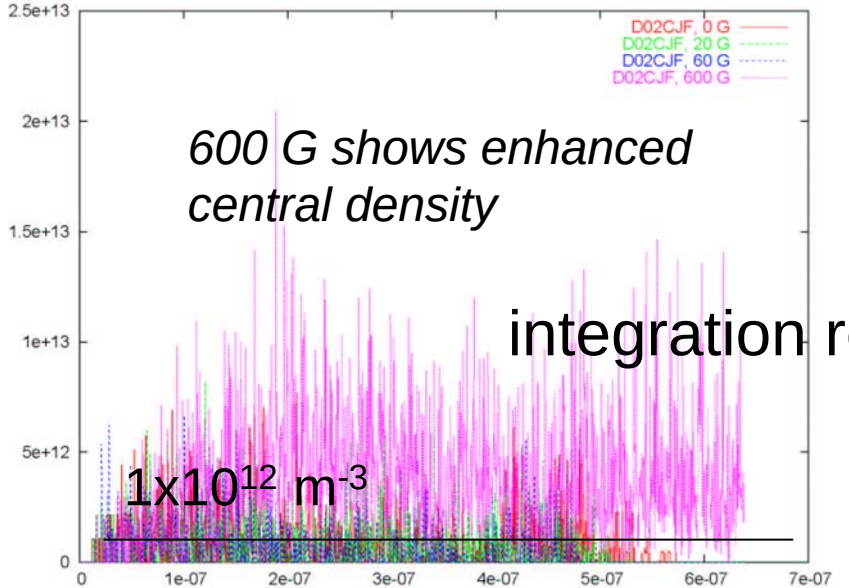
*0, 20, 60, 600 G*
*no difference!*




*0, 20, 60, 600 G*
*no difference!*

line density

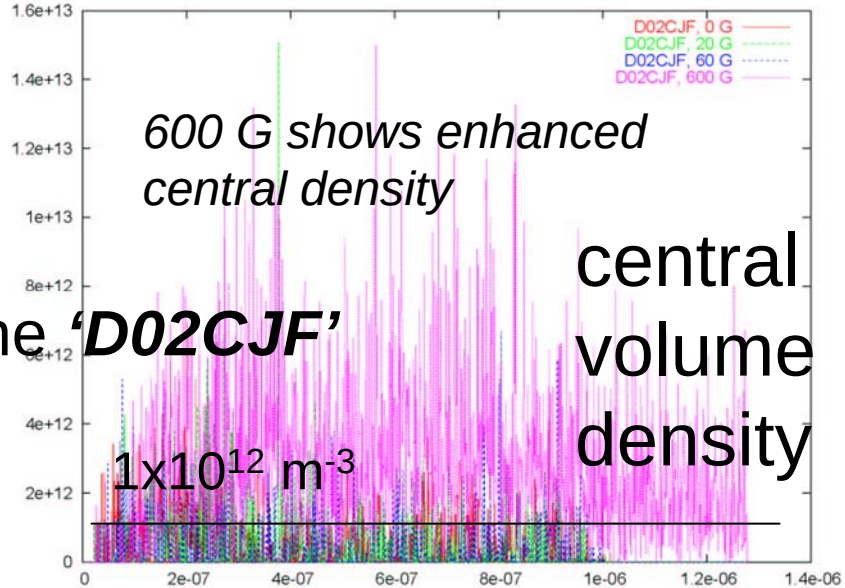
2 buckets spacing




*600 G shows enhanced central density*

$1x10^{12}$ $m^{-3}$

4 buckets spacing




*600 G shows enhanced central density*

$1x10^{12}$ $m^{-3}$

integration routine ***'D02CJF'***

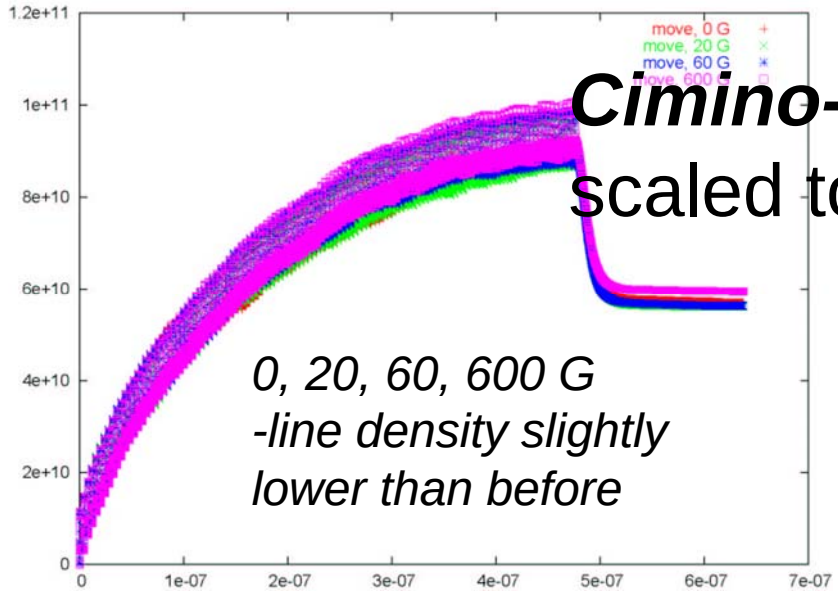
central volume density

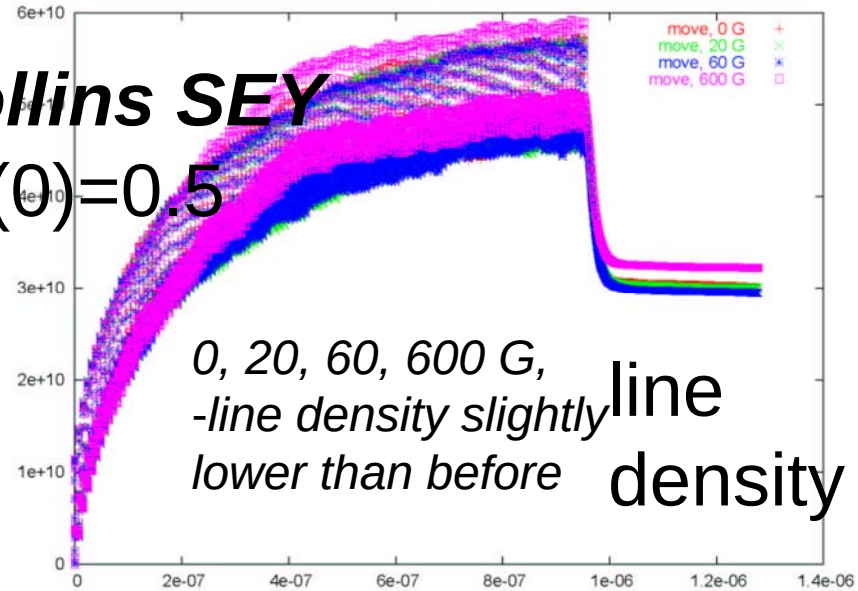
*line density & central volume density not reduced by solenoid field!*

*simulation for combined quadrupole and solenoid*

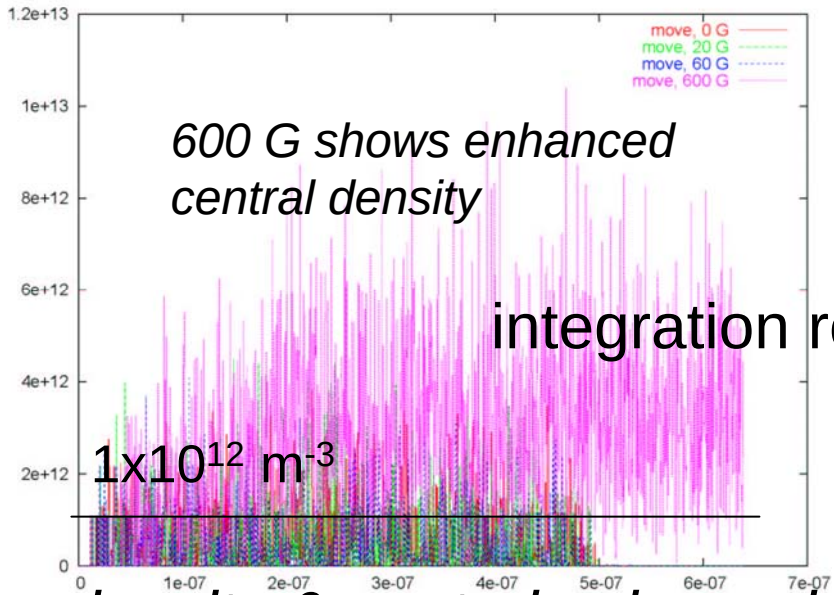
**Cimino-Collins SEY**

scaled to $\delta(0)=0.5$

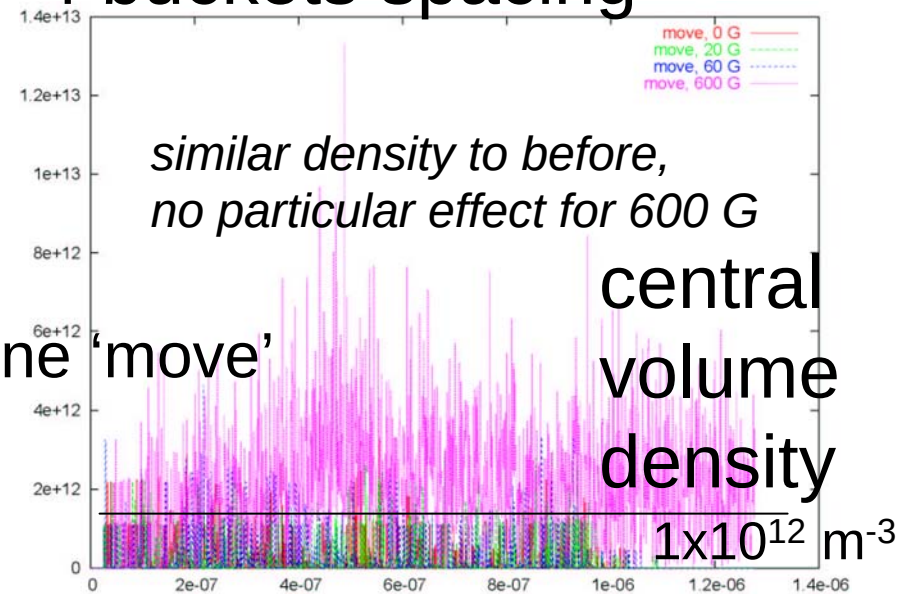



2 buckets spacing



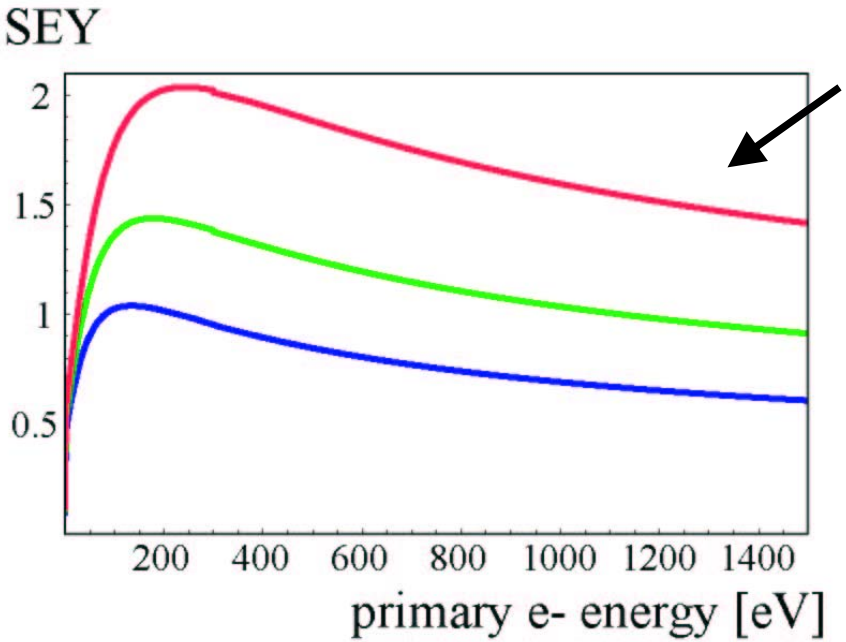

4 buckets spacing




integration routine ‘move’

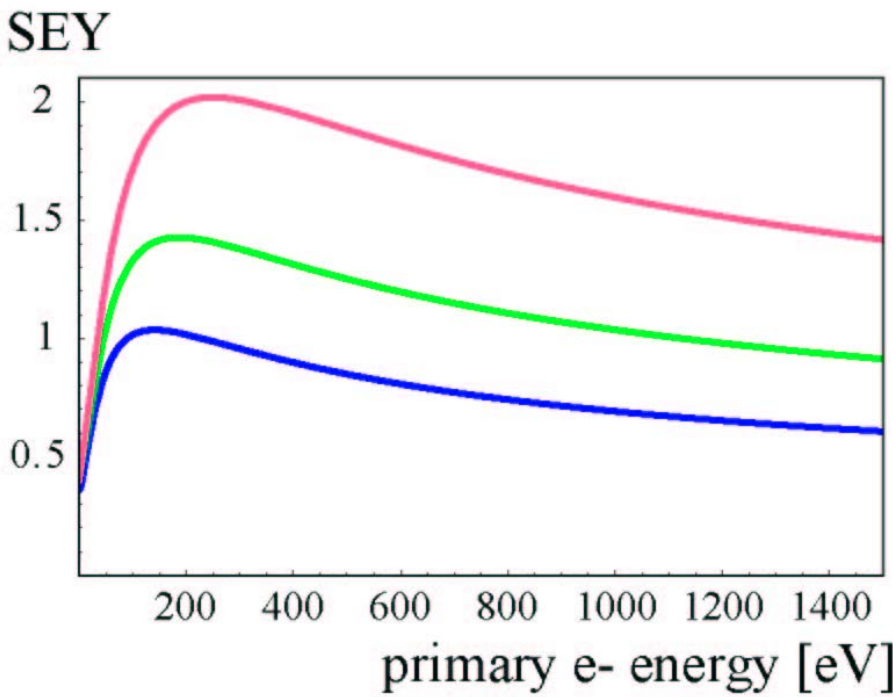
*line density & central volume density not reduced by solenoid field!*

# different models of SEY with elastic reflection

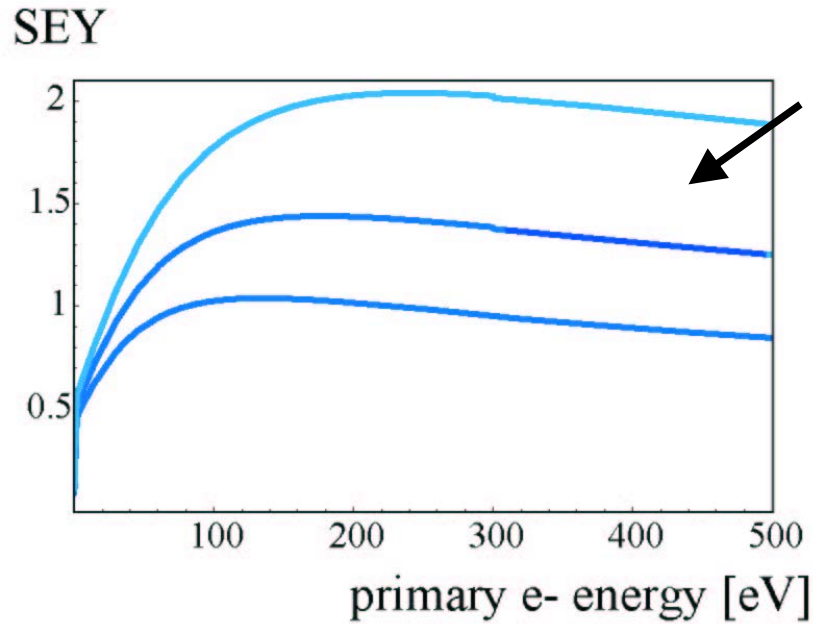



Hilleret parametrization of elastic reflection

quantum-mechanical parametrization of Cimino-Collins data scaled to 50% reflection probability at 0 energy



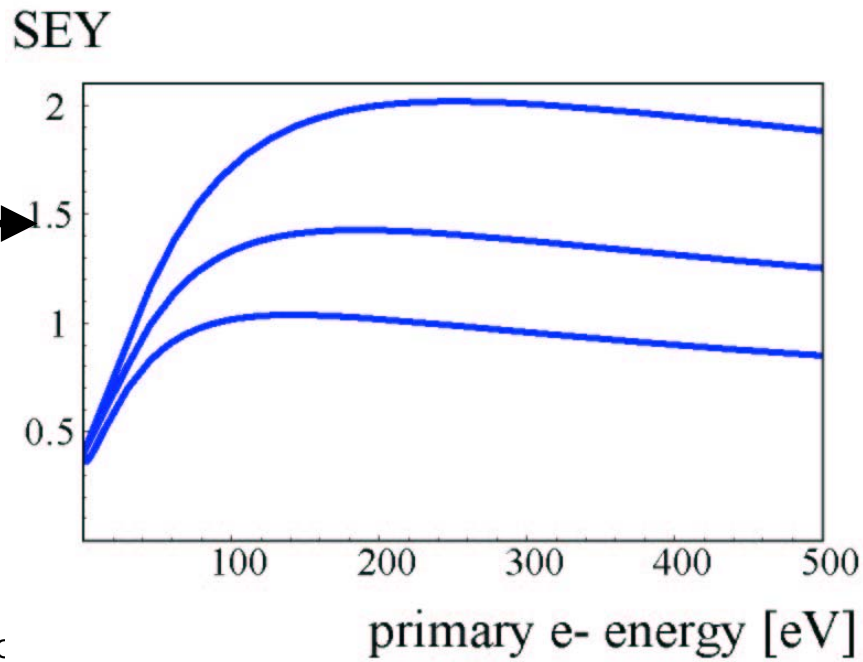
# different models of SEY with elastic reflection




Hilleret parametrization of elastic reflection

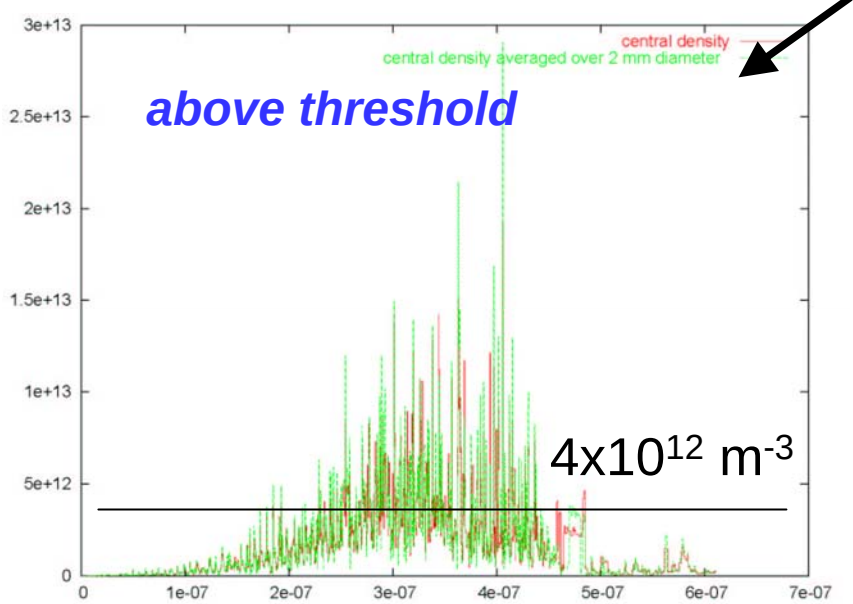
*zoomed view*

quantum-mechanical parametrization of Cimino-Collins data scaled to 50% reflection probability at 0 energy



# central cloud density in ILC DR bend vs. time

$\delta_{max}$=1.4

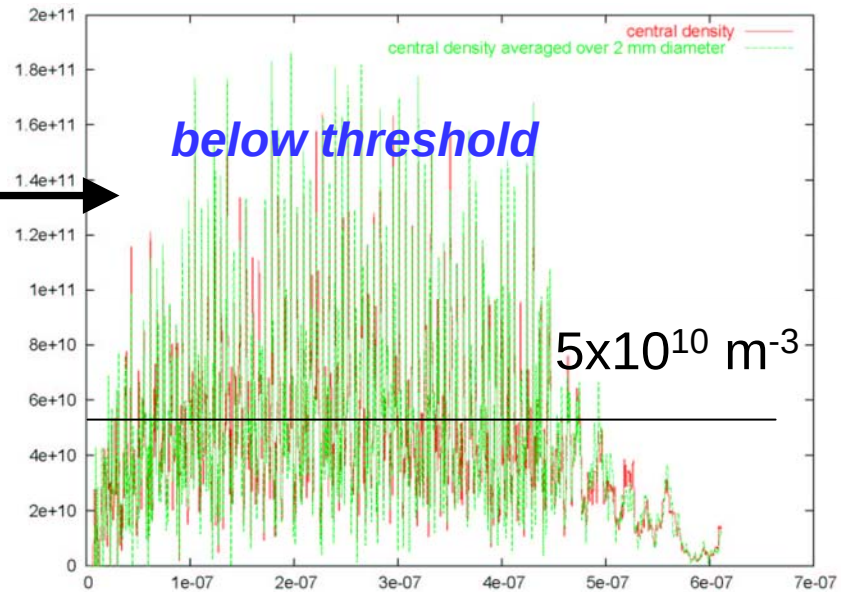



Hilleret parametrization of elastic reflection

*ILC-DR OCS*

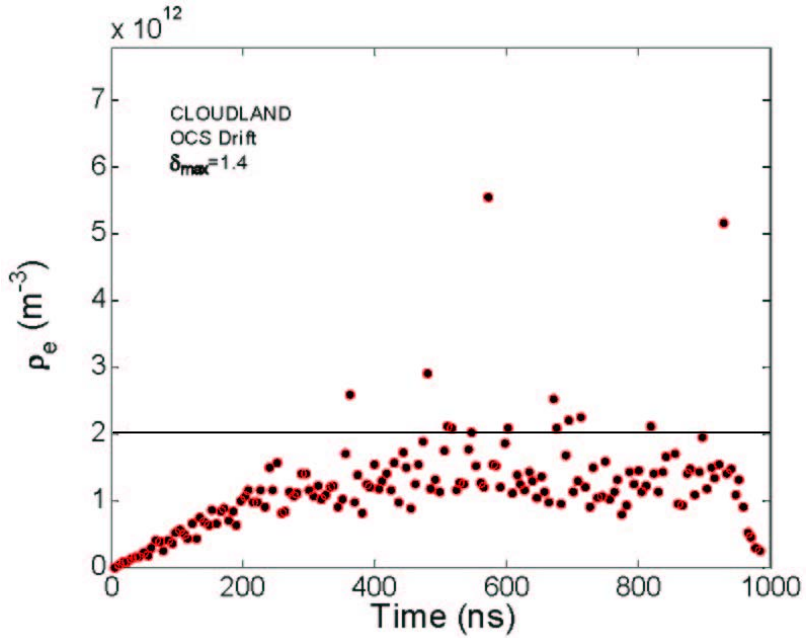
ECLOUD code

quantum-mechanical parametrization of Cimino-Collins data scaled to 50% reflection probability at 0 energy




*result strongly depends on SEY model*

# central cloud density in ILC DR bend vs. time - 2




## CLOUDLAND code

10% elastic reflection at 0 energy

Wang Lanfa

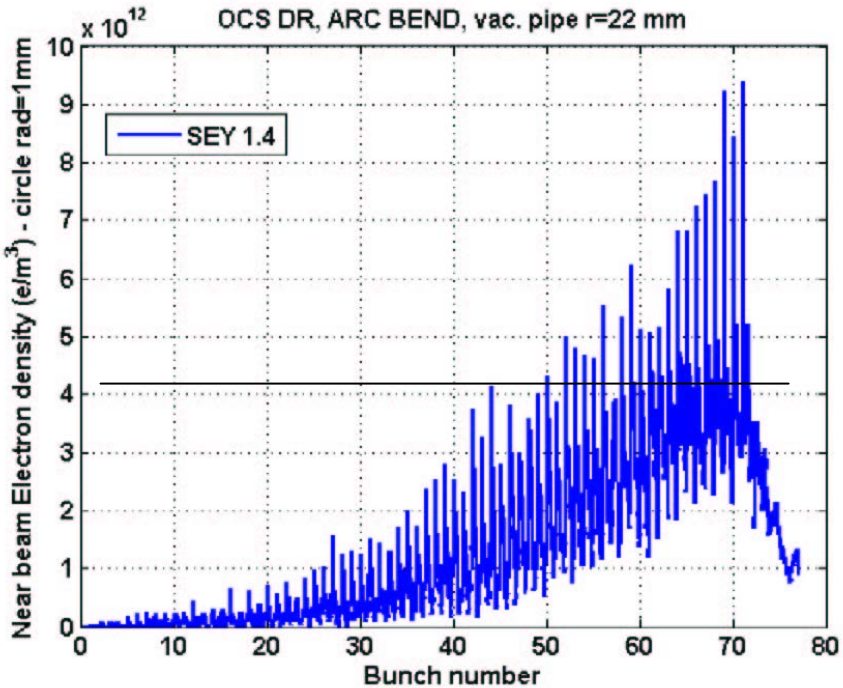
$2 \times 10^{12}$ m$^{-3}$

## POSINST code

with ~40% reflectivity
at 0 eV (Hilleret model)

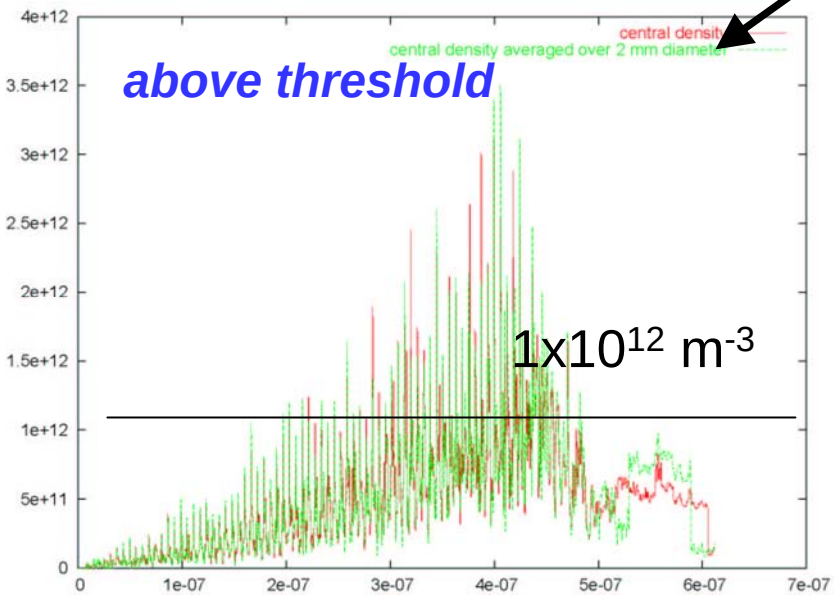
Mauro Pivi

$4 \times 10^{12}$ m$^{-3}$



# central cloud density in ILC DR bend vs. time

$\delta_{max}$=1.2

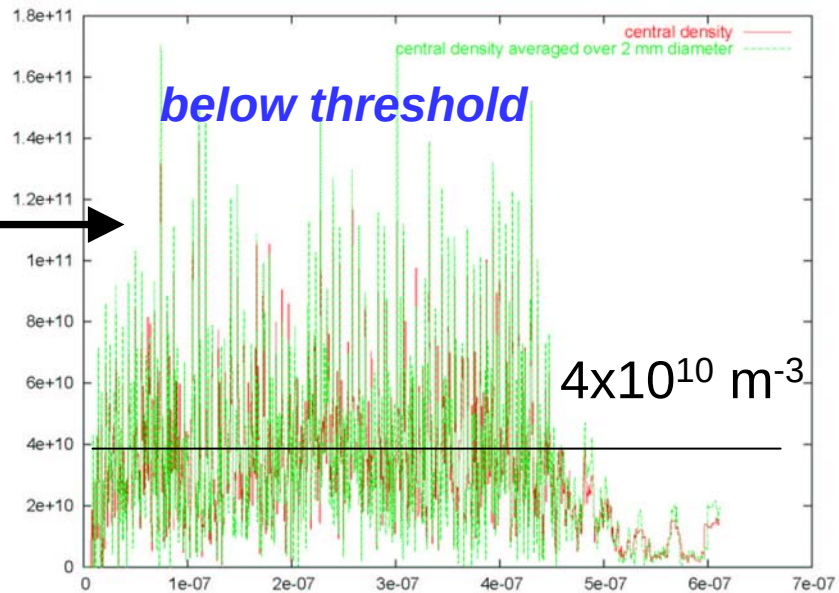



Hilleret parametrization of elastic reflection

*ILC-DR OCS*

ECLOUD code

quantum-mechanical parametrization of Cimino-Collins data scaled to 50% reflection probability at 0 energy




*result strongly depends on SEY model*

# ILC DR OCS (6.3 km)