

Electron cloud meeting #41, 10/04/2017

Participants: L.R. Carver, P. Dijkstal, G. Iadarola, L. Methner, A. Romano, G. Rumolo, G. Skripka, B. Bradu, M. Shenk, E. Metral, K. Li

Arising matters (Giovanni Iadarola)

Gianni presented an update on the heat load estimates at the Joint LARP CM28/HiLumi Meeting. During the same trip, he visited LBNL where he gave a seminar on e-cloud studies at CERN and discussed with Jean-Luc Vay and Miguel Furman about possible collaboration paths.

There was a short meeting with Monika Sitko from TE/VSC regarding the laser treatment of the IR2 and IR8 triplet chambers. They are developing a robot carrying a laser with a fixed focus. For this reason, they would prefer to treat only the round parts. A skype meeting with the UK collaborators will take place to discuss the different possibilities.

The LHC scrubbing run might be anticipated by a week, most likely the week of the 29 May.

We have made an MD request to have 50 ns fills in order to characterize the heat load difference between sectors. The purpose is to run without e-cloud but still have significant load. Synergies with collimation MDs have been identified.

HTCondor migration (Giovanni Iadarola)

The IT department is changing the software used to manage the batch service, moving from LSF to HTCondor, which is an open-source and more performant. Computing resources are being gradually moved. On the 20th of April 50% of resources were moved to HTCondor and 30th of May 90% will be on FTCondor. By end of 2017 LSF will not be supported anymore.

We need to move to HTCondor and identify the possible problems now. Some pilot tests have been done already and no problems were revealed so far.

Usually we set up an e-cloud study by using a *config.py* script which generates a folder structure with the different jobs. It also generates a run script which is executed to submit jobs. To avoid rewriting everything an additional module was developed which can be added to the present scripts to be able to run on HTCondor.

First of all, the user needs to add *htcondor_config.py* module to his *config* folder. Then in the *config.py* file two lines need to be added in order to configure jobs for HTCondor. Since HTCondor does not have queues, one just gives an estimate of the time needed for simulation. At the moment, this cannot be more than a week.

The user can then run *config_scan.py*. This creates an executable file called *run_htcondor*, which submits jobs.

Once running the submission script, HTCondor creates a cluster of jobs numbered progressively. The command *condor_q* gives the status of the jobs. Another typical action is to kill a job and this can be done by using *condor_rm* command. There is a dashboard for monitoring the HTCondor activity here: <http://information-technology.web.cern.ch/services/batch>.

High order multipoles in PyECLoud (Philipp Dijkstal)

There is a need to include the higher order magnets to estimate the heat loads. Previously there were only dipoles, quadrupoles and drifts. Now arbitrary multipoles can be simulated and the skew component of the magnetic field is also implemented in PyECLoud. The user specifies the *B_multip* and *B_skew* vectors in the input file. The PyECLoud documentation was updated accordingly.

During the implementation, Philipp found that the *complex C* data type was slower than using *double* for real and im parts.

A test script was added to PyECLoud for plotting the field maps. Tests have shown that fields behave as expected and field maps were found to be consistent for normal and skew magnets. The field strength along the axis matches the expected behavior as well. Comparison of a normal and skew quadrupoles in a round chamber showed the expected identical results for the heat loads. One can also make movies for the higher order magnets now.

Preliminary simulations were performed for octupoles, dipole correctors and sextupoles in the LHC arcs. First results for the heat loads vs SEY calculations show that drifts have higher threshold and sextupoles and octupoles have similar behavior. More studies will be done.

The validation and documentation are complete and the new version 6.2 will be released very soon. The next step in the simulation study is to add photoemission seeding and continue with the systematic modeling of cells.

Electron cloud at the LHC and LHC injectors (Giovanni Rumolo)

Giovanni rehearsed his invited talk for the IPAC conference.

Adjournment

The next meeting will be on Friday, April 10th, at 16 o'clock.

GS 10/05/2017