You can help CERN and fundamental research !

During the upcoming Large Hadron Collider Run 2, the experiments will produce more data than ever before. The CERN computer centre and the Worldwide Computing Grid will reach full capacity when running data reconstruction and analysis jobs.

In parallel, the experiments, accelerator physicists and theorists will also need a lot of computing capacity for simulations of new physics, or to design the next generation of accelerator and detectors.

This is an area where *you* can help, by running one of the LHC@home programs on *your* PC or laptop when these are idle.

Contributions from volunteers have already played a major role for LHC beam simulation studies though a program called SixTrack. The computing capacity they made available corresponds to about half the capacity of the CERN batch system! Thanks to this precious contribution, detailed and CPU-intensive studies of subtle beam dynamics effects were performed. This proved extremely useful not only for the current accelerator, but also for the design of its upgrade, the HighLumi-LHC.

More recently, the scope of LHC@home was greatly extended. Simulations run in a small virtual machine which can be installed on all types of volunteer computers. Theorists needs were addressed in a project called Test4Theory. Results are submitted to a database which now contains a very wide set of data corresponding to many accelerator experiments worldwide, including of course experiments at the LHC at CERN. These are used to perform theoretical parameter fitting, in the Theory Department at CERN. Since 2011, about 2.7 TRILLION events have been simulated in this way, and counting...

Following this success the LHC experiments declared interest. The ATLAS experiment was the first to join, and the number of volunteers engaged into ATLAS physics events simulation has been steadily ramping up for the last 18 months. These events are fully integrated into the experiment simulation and data management, and are already used for the physics analysis of Run 2. Soon other LHC experiments will join LHC@home.

It is really easy to join! All instructions are given on our LHC@home web site, that also includes a video tutorial. You can configure programs to automatically stop or slow down the computations when you start to use your PC again, so these background simulations will not disturb you.

If you have the habit of leaving your desktop and laptop “on” when you are not using them, instead of wasting electricity on idle capacity, you can put your PC's power to good use for real simulations, that benefit CERN and the experiments :

Help our accelerator and research community and join LHC@home !

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