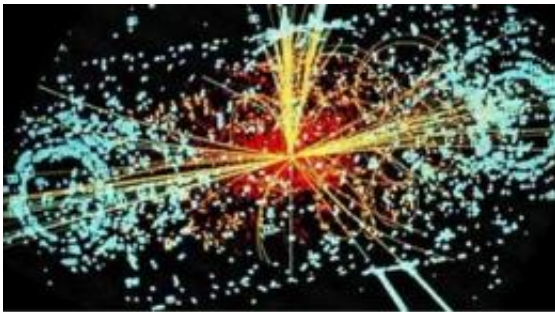# Use your own computer to tame protons at CERN

October 24 2011, By Lionel Pousaz

Help to unravel the mysteries of the Universe! With the SixTrack project developed by EPFL, your computer can provide CERN with additional computing power.

The Large Hadron Collider (LHC) is a powerful instrument to crash protons. Although minute in size, these subatomic particles have huge power as they rush close to the speed of light through the 27 kilometer-long underground circular tunnel. If they went the slightest bit off course, they could cause serious damage to the collider. This is why scientists must precisely anticipate the movements of these unpredictable particles. EPFL physicists Leonid Rivkin and Igor Zacharov have developed a project enabling any volunteer to contribute to this challenge.

It is press release, [CERN](#) notes that beams of protons are subject to the chaos principle. As with the "butterfly effect", according to which the flap of a butterfly's wings in Japan can set off a tornado in Texas, this means that even the slightest change in the conditions around the bunch of protons could throw it off course, particularly after several hundred thousand revolutions.

Predicting the protons' motion requires huge [computing power](#). Scientists simulate collisions over and over again. In particular, they take into account the slightest flaw in any of the 1,232 magnets, weighing 35 tons each, down to a fraction of a millimeter. The challenge has been successfully met so far, as no proton has smashed against the accelerator's wall to date.

Stronger magnets are to be fitted in 2020 to reduce the beam size ever further, in order to increase the chance of collisions. From the simulation point of view, this is essentially a new machine. This is why Igor Zacharov has revived the LHC@Home program. By installing simple software running under Windows, MacOS or Linux, anyone may contribute spare processing capacity on their computer. Entitled SixTrack, this project will serve to prevent protons smashing into the walls of the [LHC](#) over the next decade.

More information: [Download the software](#)

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