

Plastic SUPER PROTON SYNCHROTRON

Let's keep the ball rollin'

Dear Visitor,

during the open day, you have already learned about how a particle accelerator works. In LHC we accelerate particles here, at point 4. You can read more about the acceleration process on the posters among you.

The acceleration is a sophisticated process which in LHC requires high voltages up to 16 millions Volts and a very precise time synchronisation at a level of a billionth of a second.

We have prepared a small 'toy' accelerator for you. It is a proper synchrotron, it can accelerate only one particle and to velocity only about 0.000 001 % of the speed of light.

We call it the **Super Plastic Synchrotron**.

Despite the technical parameters it has one advantage: **You can control it!**

So, become an operator, try to control the machine and accelerate the steel ball to high energy! It is all in your hands now!

HAVE FUN!

User manual:

The accelerator gives a "kick" to the particle every time it passes through the copper coil installed on the left-hand side of the machine. Every time the particle receives a kick, the green lamp will flash. No flashing means no energy is transferred to the ball.

In order to start it, the ball needs to pass through the sensor at the entrance to the coil. If the machine is at rest, it may need a gentle help to get the ball moving. Please do not do it on your own. Ask our CERN colleague to help you.

Automatic mode:

The accelerator automatically propels the particle every time it passes through the coil. You can control the energy by the large rheostat on your right-hand side. Increase the velocity (energy) by slowly moving the control knob up. You can observe the energy history on the screen in front of you.

Manual mode:

This mode is for a hardcore accelerator operators (or computer games addicts 😊). We have disabled all automatic control loops and you have to propel the ball manually by pressing the red trigger button at a very precise moment, just before the ball is about to enter the coils.

If you hit at the correct moment the green lamp will flash and the ball will receive a kick. If you are too late, the ball will pass without getting energy and after some time it will eventually stop. The energy control is still active so if you have "slow fingers" try at a low energy setting first.

	Large Hadron Collider	Super Plastic Synchrotron	
Circumference (meters)	26 659	1.885	Circonférence
Particle type	Proton, Lead Ion	Steel ball	Type de particule
Total number of accelerated particles	365 040 000 000 000	1	Nombre de particules par faisceau
Number of turns per second	11 245	0.5 - 1	Nombre de tours par seconde
Particle velocity at injection (meters per second)	299 791 858	0.5	Vitesse des particules à l'injection
Particle velocity at top energy (meter per second)	299 792 455	2	Vitesse des particules à haute énergie
Accelerating voltage (Volts)	16 000 000	48	Tension d'accélération
Could you play with it?	NO	YES!!!	Pouvez-vous jouer avec?