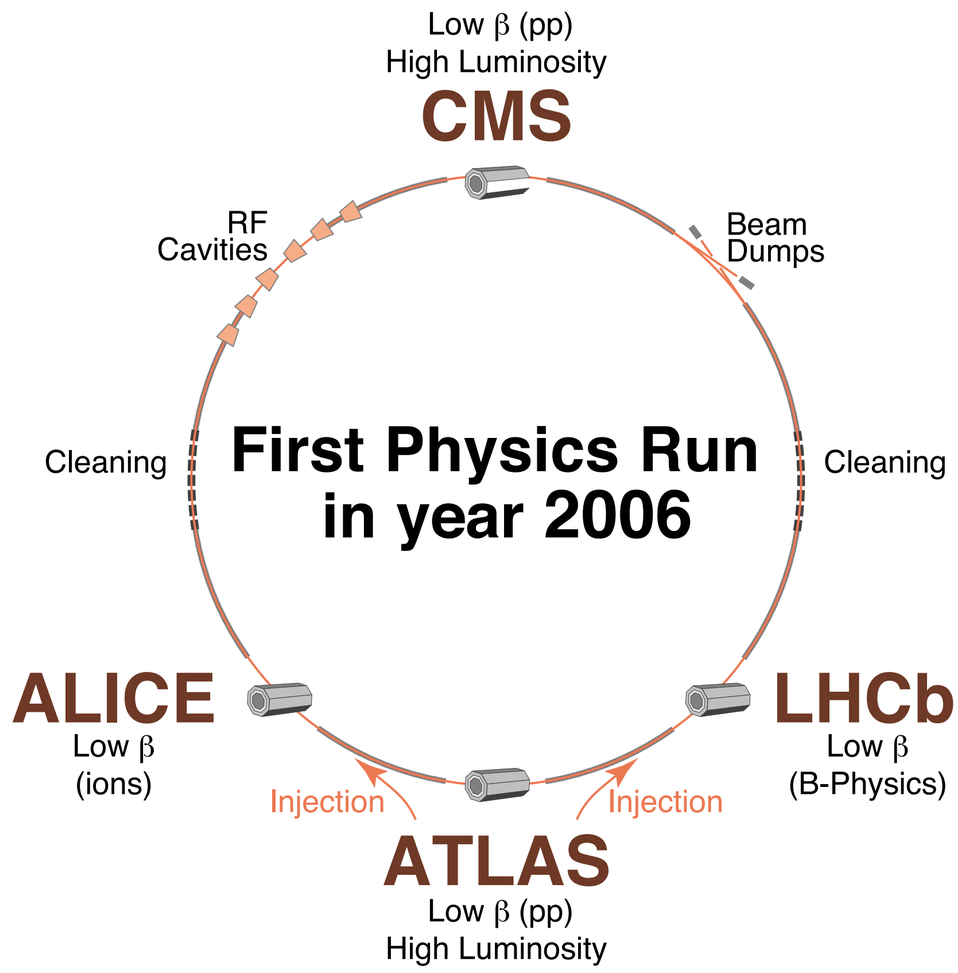
# The LHC machine

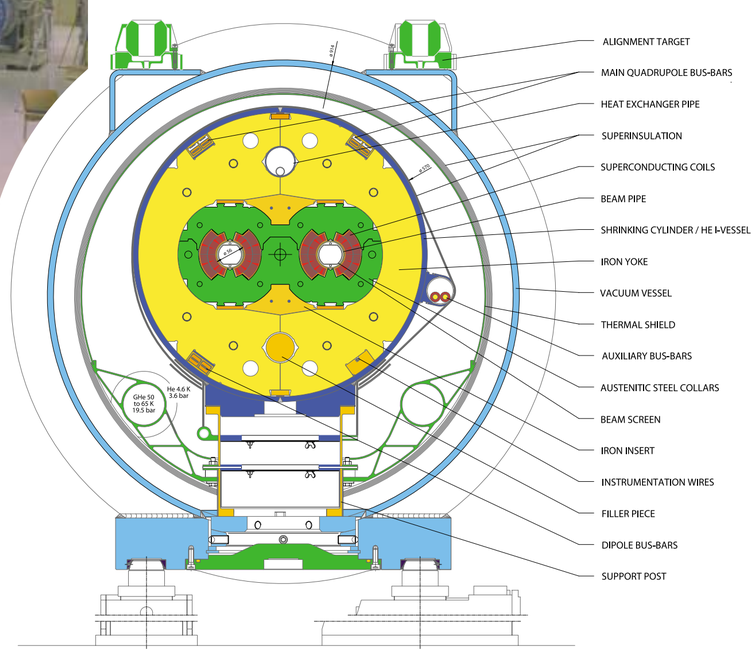
The LHC will enable the study of proton-proton and ion-ion collisions. The existing chain of injectors (LINAC, booster, PS, SPS) will provide the necessary particles.




## Performance Parameters

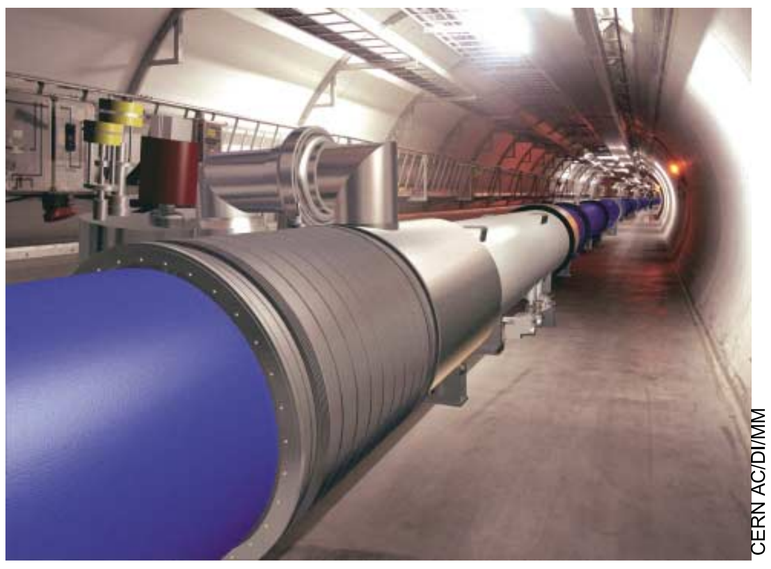
| | | |
|---|---|---|
| Energy | TeV | 7.0 |
| Dipole field | T | 8.3 |
| Coil aperture | mm | 56 |
| Distance between apertures | mm | 194 |
| Luminosity | $cm^{-2}s^{-1}$ | $10^{34}$ |
| Beam-beam parameter | | 0.0034 |
| Injection energy | GeV | 450 |
| Circulating current / beam | mA | 540 |
| Bunch spacing | ns | 25 |
| Bunches per beam | | 2835 |
| Particles per bunch | | $10^{11}$ |
| Stored beam energy | MJ | 334 |
| Normalized transverse emittance | μm.rad | 3.75 |
| r.m.s. bunch length | m | 0.075 |
| β-values at I.P. in collision | m | 0.5 |
| Full crossing angle | μrad | 200 |
| Beam lifetime | h | 22 |
| Luminosity lifetime | h | 10 |
| Energy loss per turn | keV | 6.7 |
| Critical photon energy | eV | 44.1 |
| Total radiated power per beam | kW | 3.6 |

The 15 m long dipoles




Work site, vault of the ATLAS experimental cavern. (05/2001)

LHC Test String II (05/2001)



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Artist's view of the LHC in the LEP tunnel

The LHC superconducting magnets will generate the highest magnetic fields ever reached in an accelerator of this scale. The dipoles and quadrupoles will be interconnected so as to form a continuous cryogenic "pipe" installed in the 27 km-long LEP/LHC tunnel with its separate cryoline. The superconducting RF accelerating cavities, along with the beam cleaning and beam dump systems, will complete the machine.

LHC

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