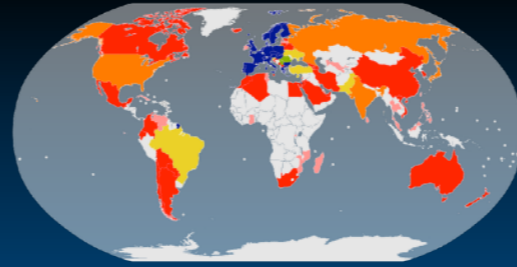


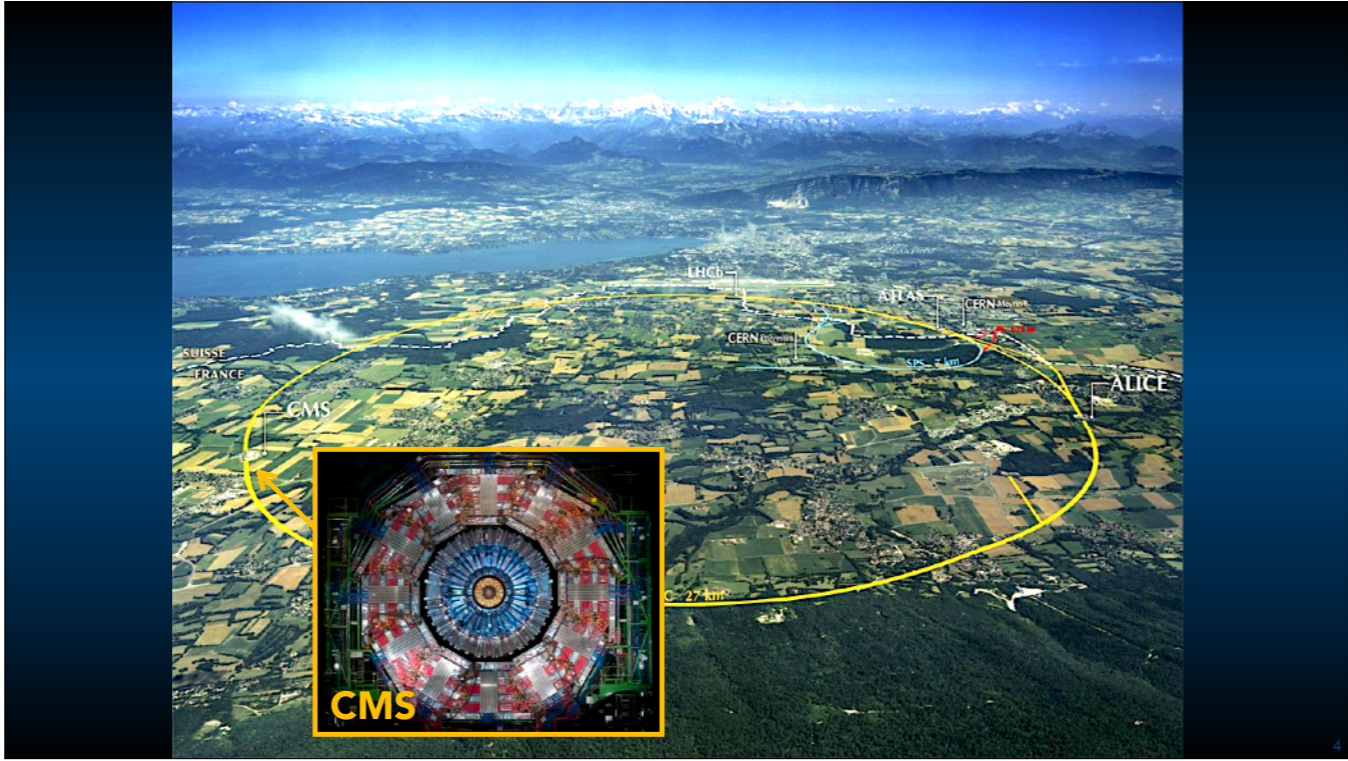


Giacomo Sguazzoni  
Istituto Nazionale di Fisica Nucleare  
CERN

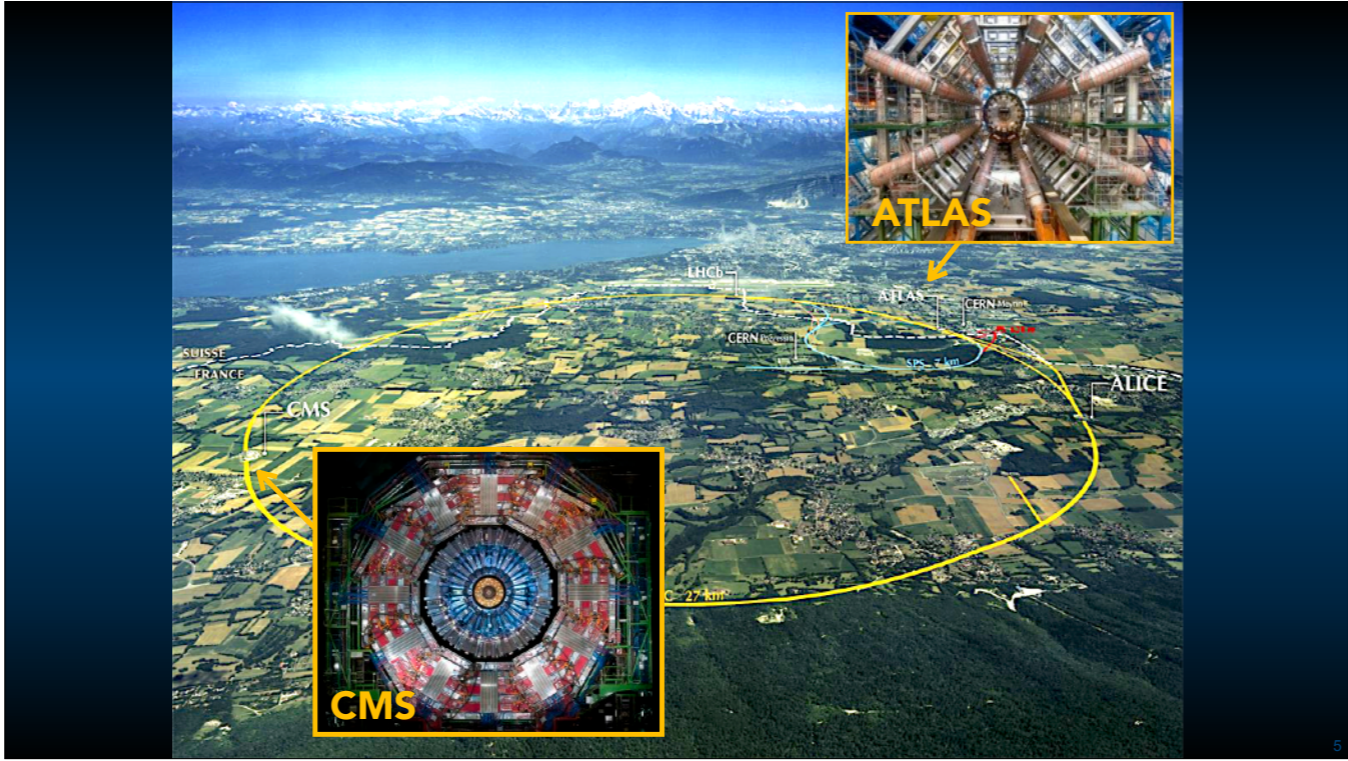















# Large Hadron Collider



# Large Hadron Collider



1 TeV =  =  = 

100.000.000 ×      ~1 mm      ~10<sup>-12</sup> mm  
[un millesimo di miliardesimo...]

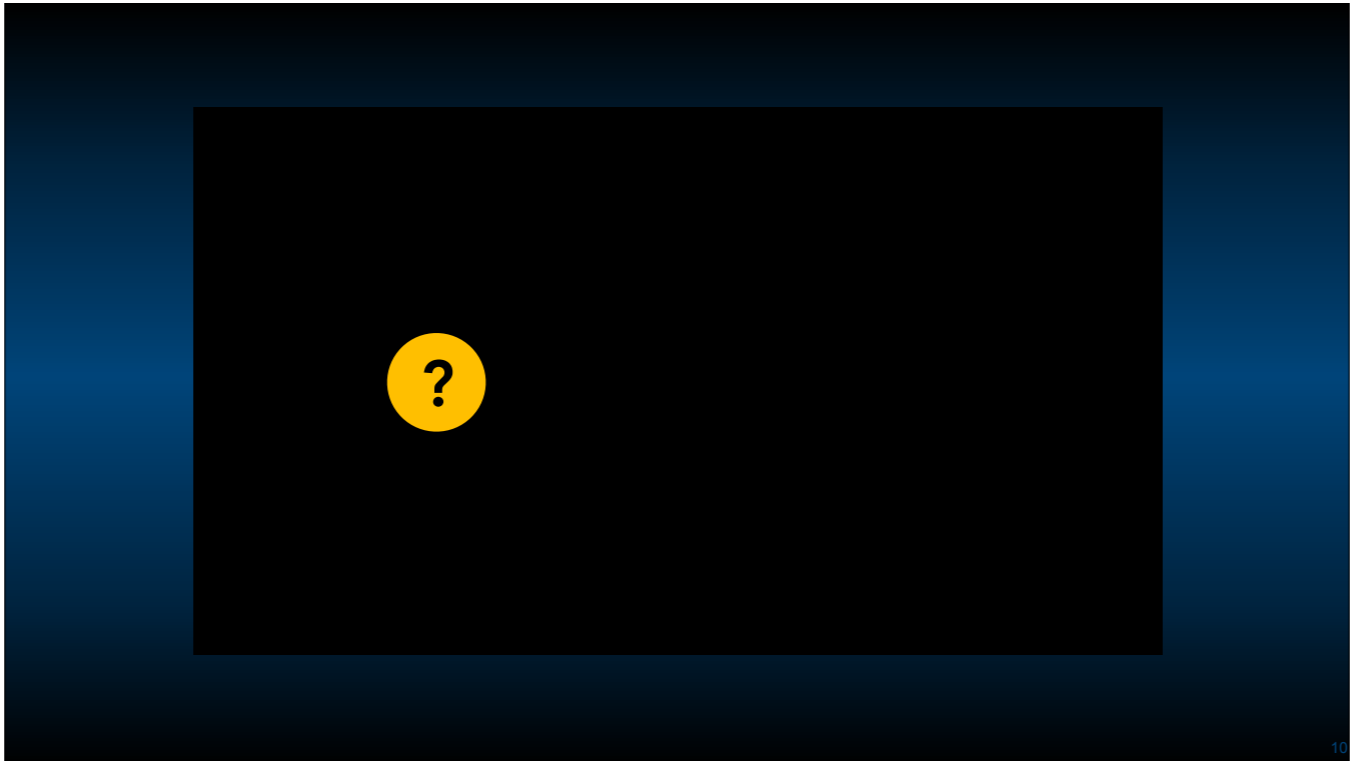
$$E = m \cdot c^2$$



*Albert Einstein - Special Relativity*



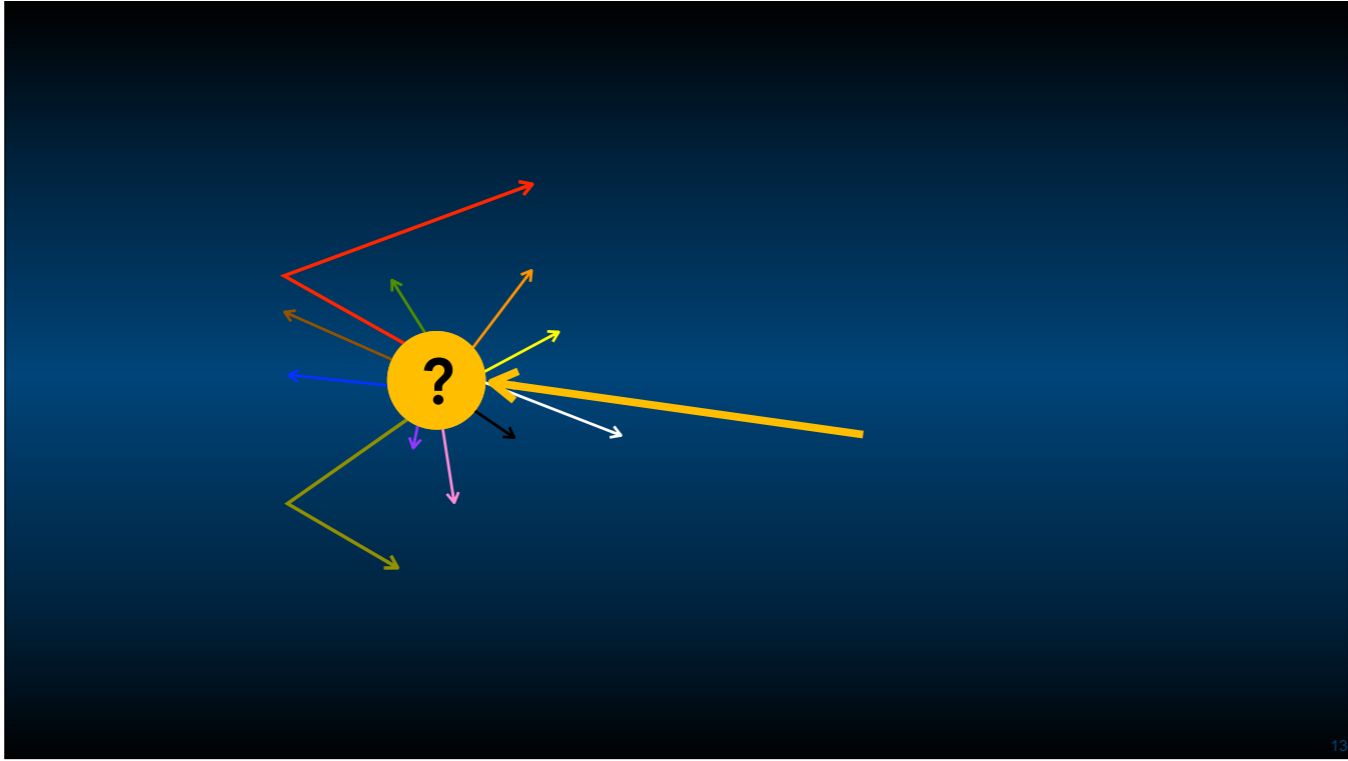


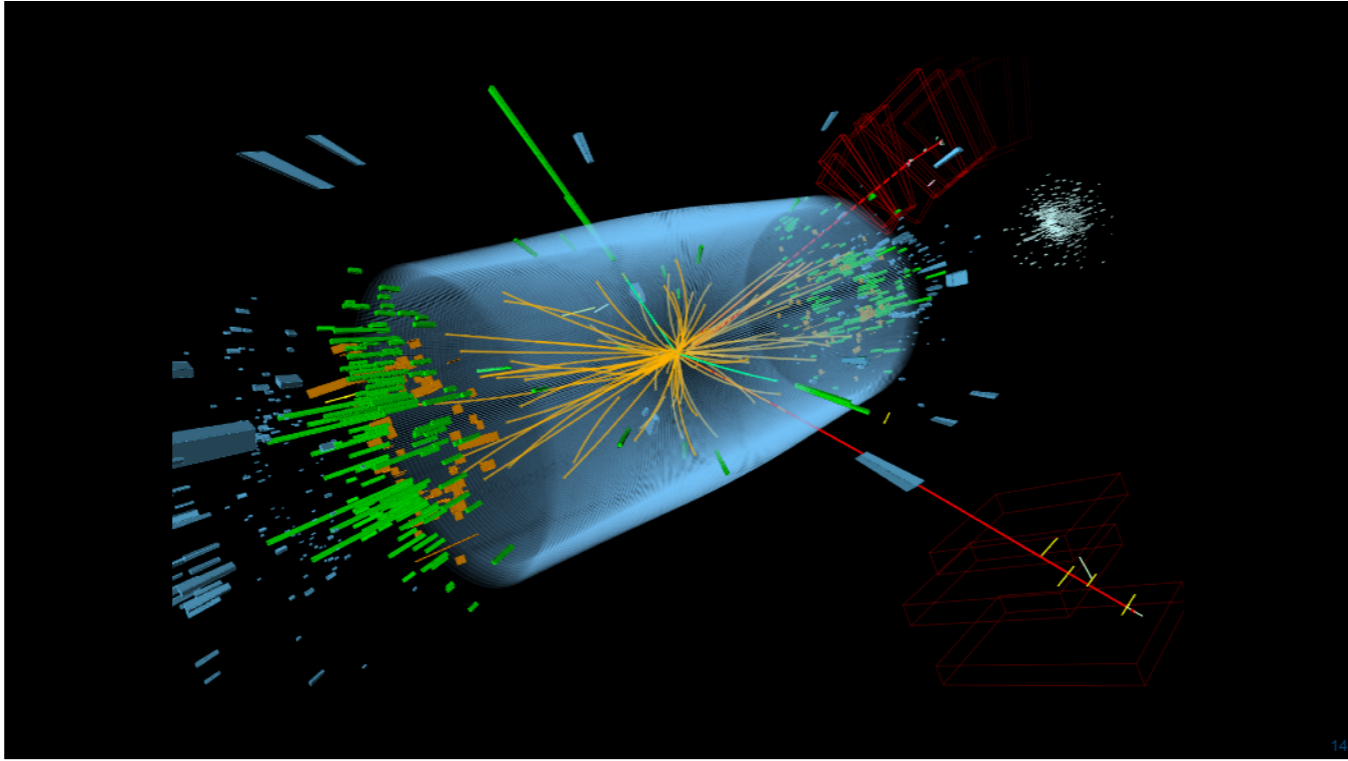


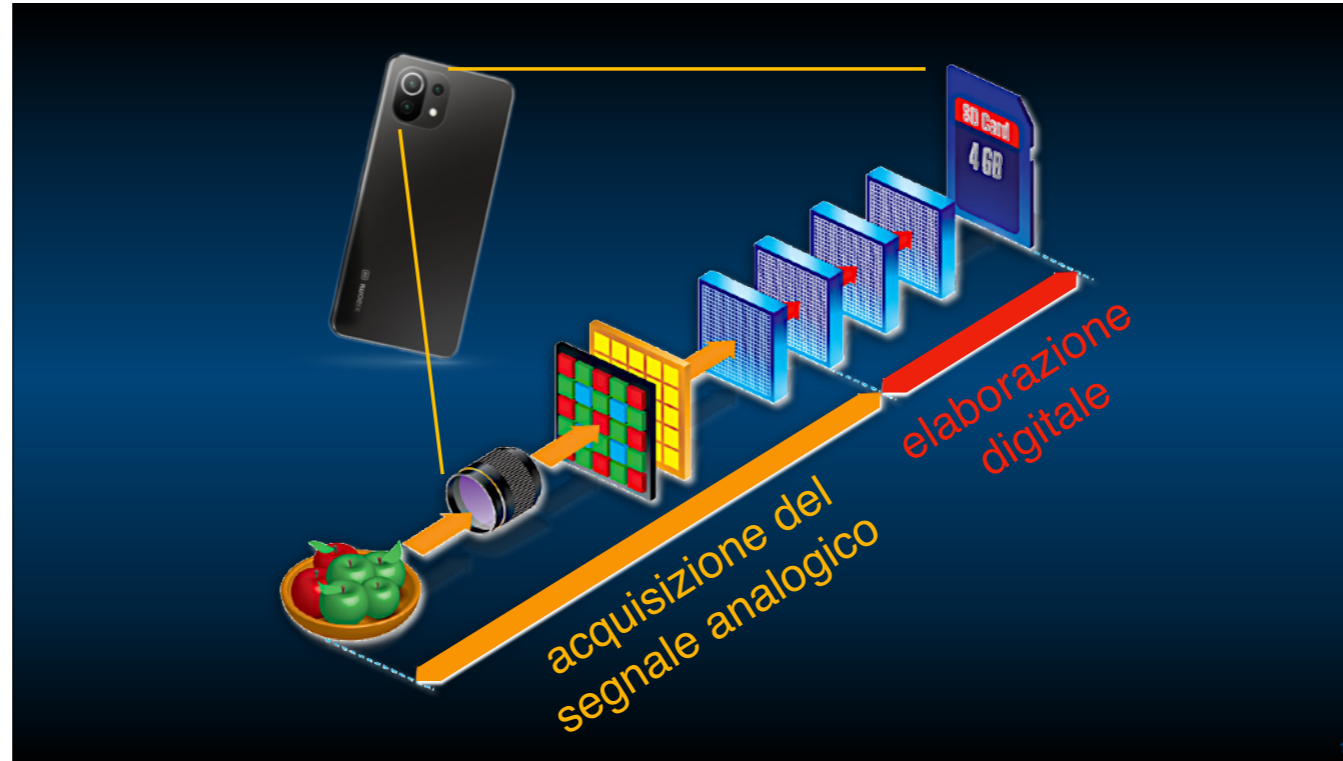


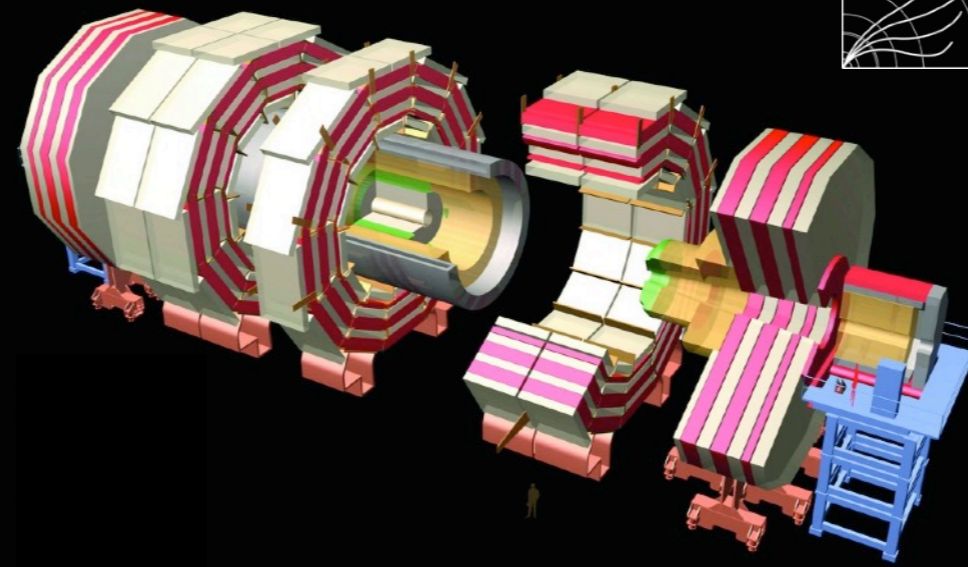






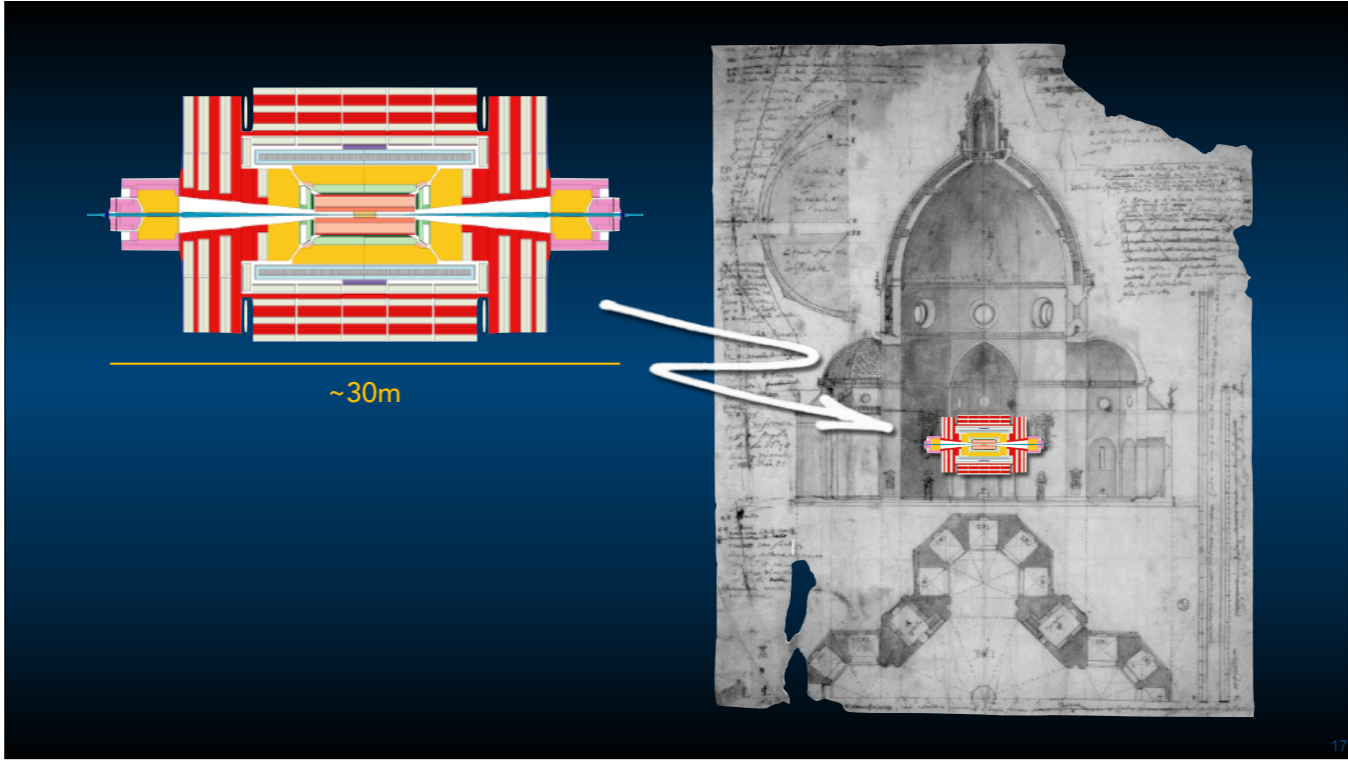


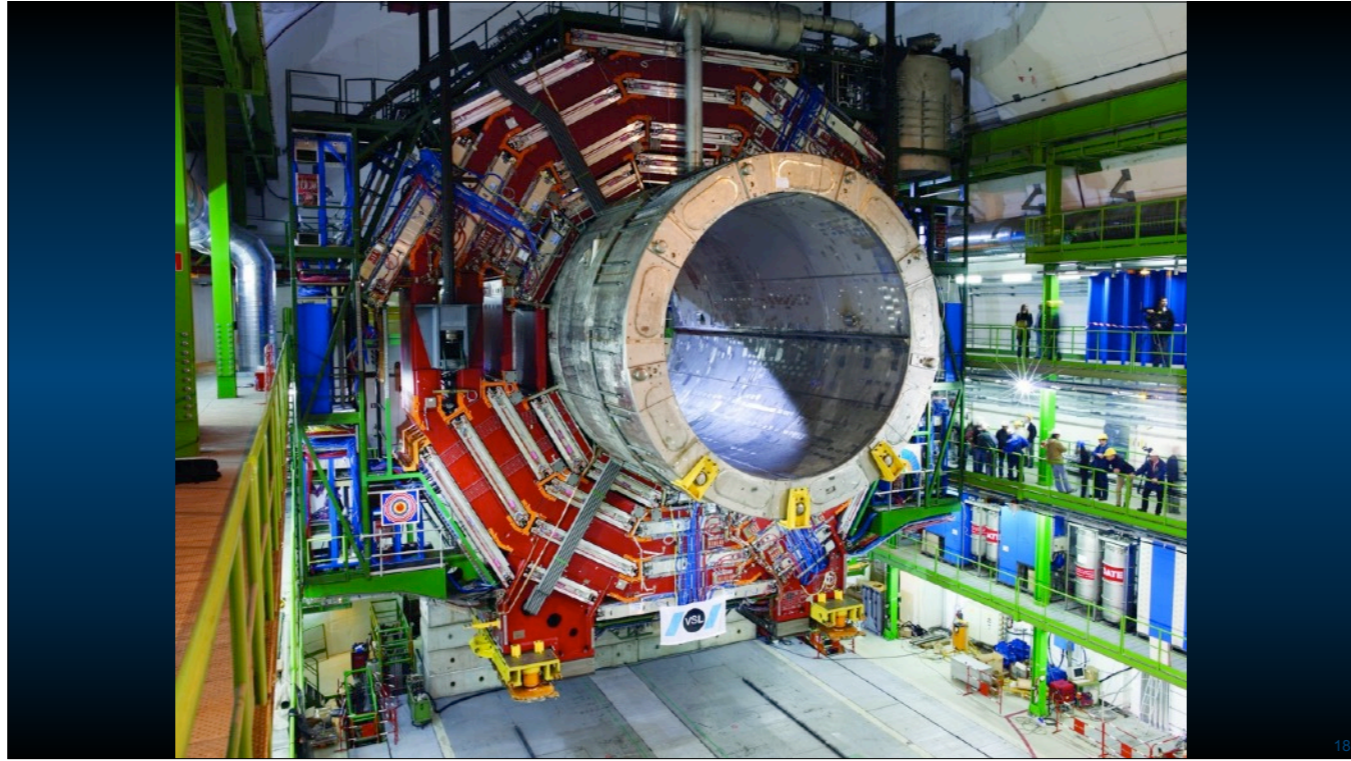


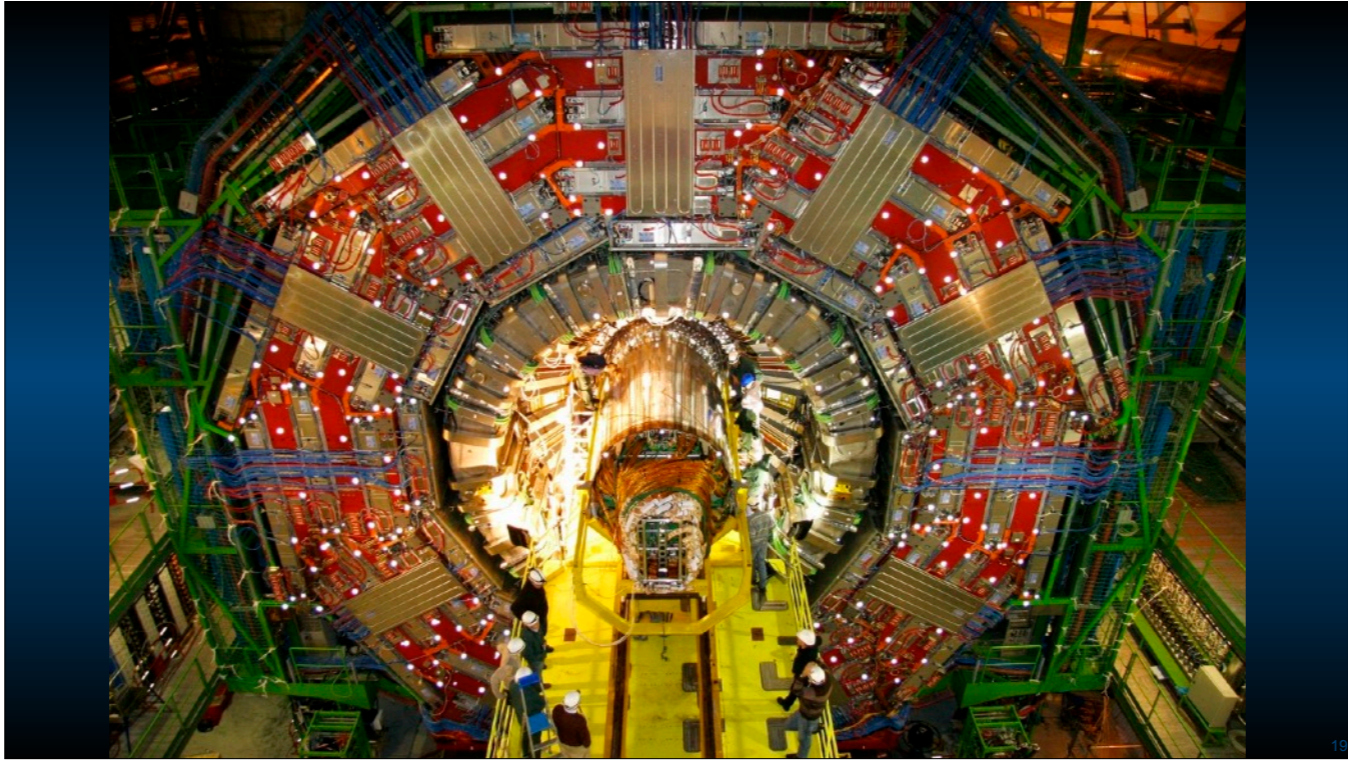


12500t, 15m di diametro, 30m di lunghezza, 4T di campo magnetico

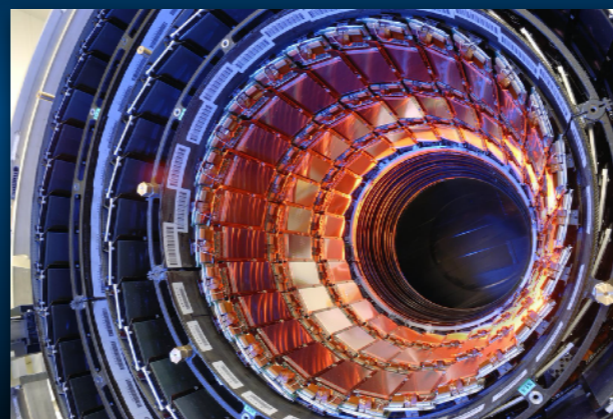
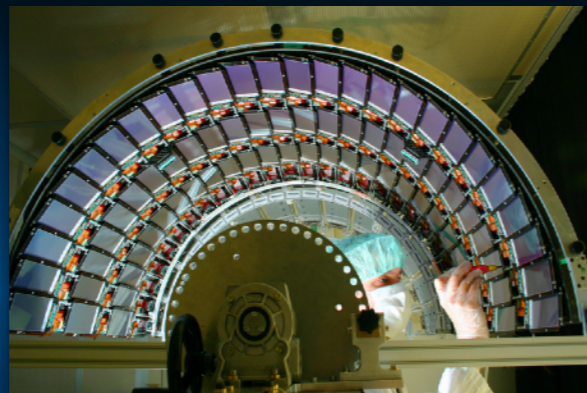




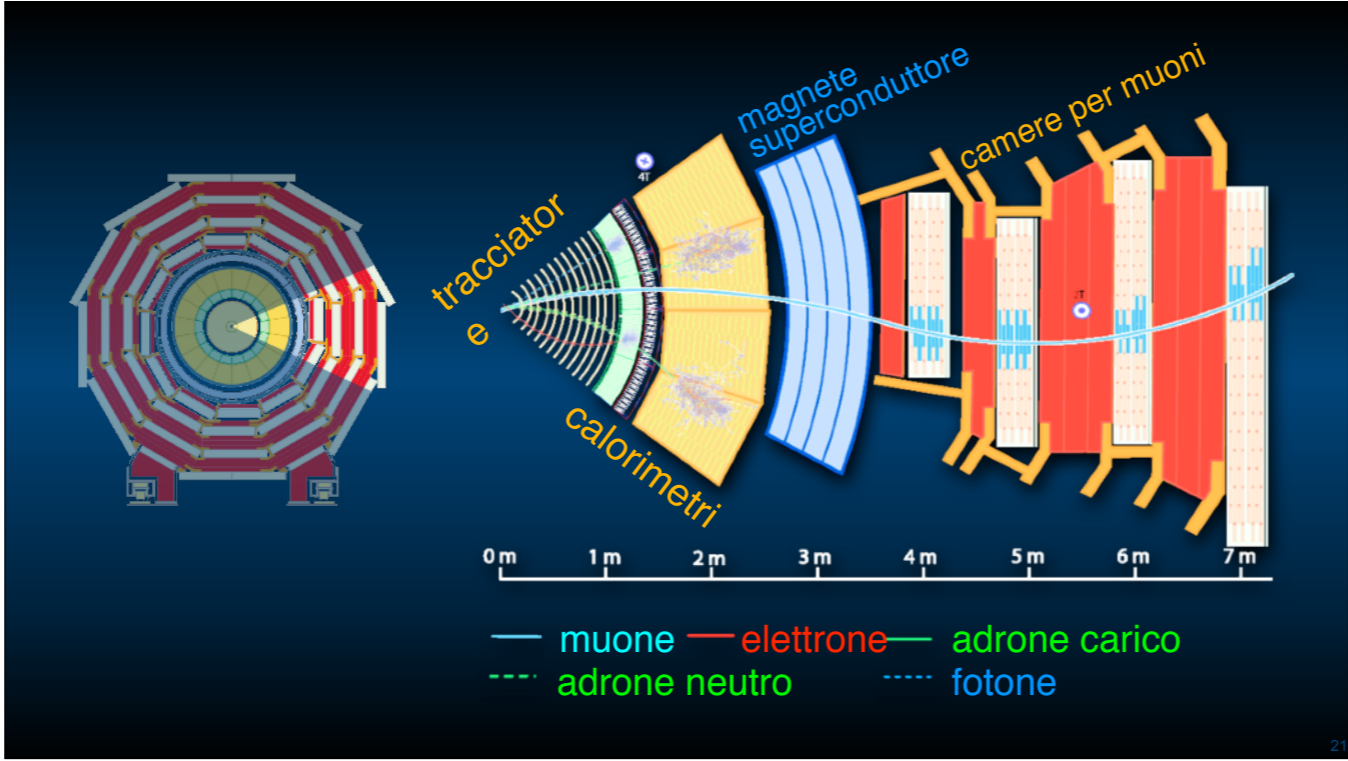


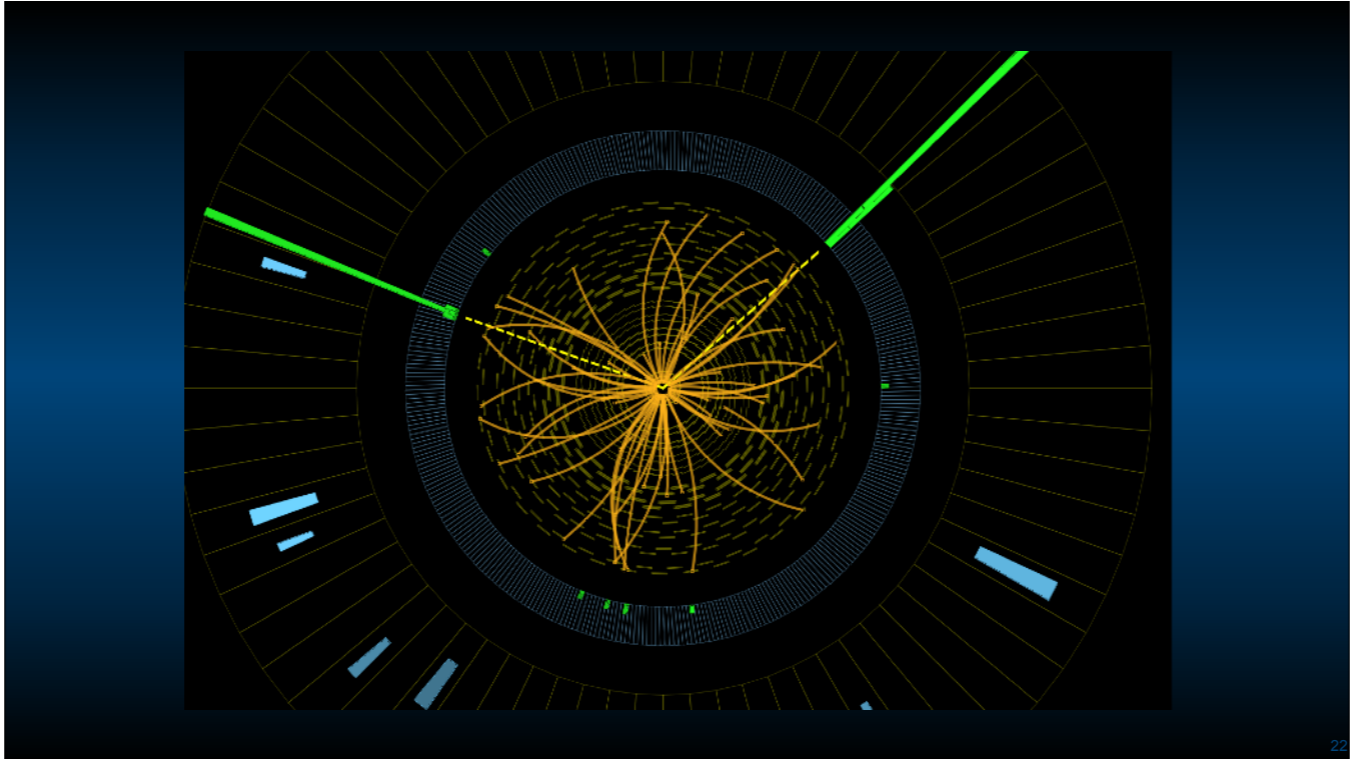


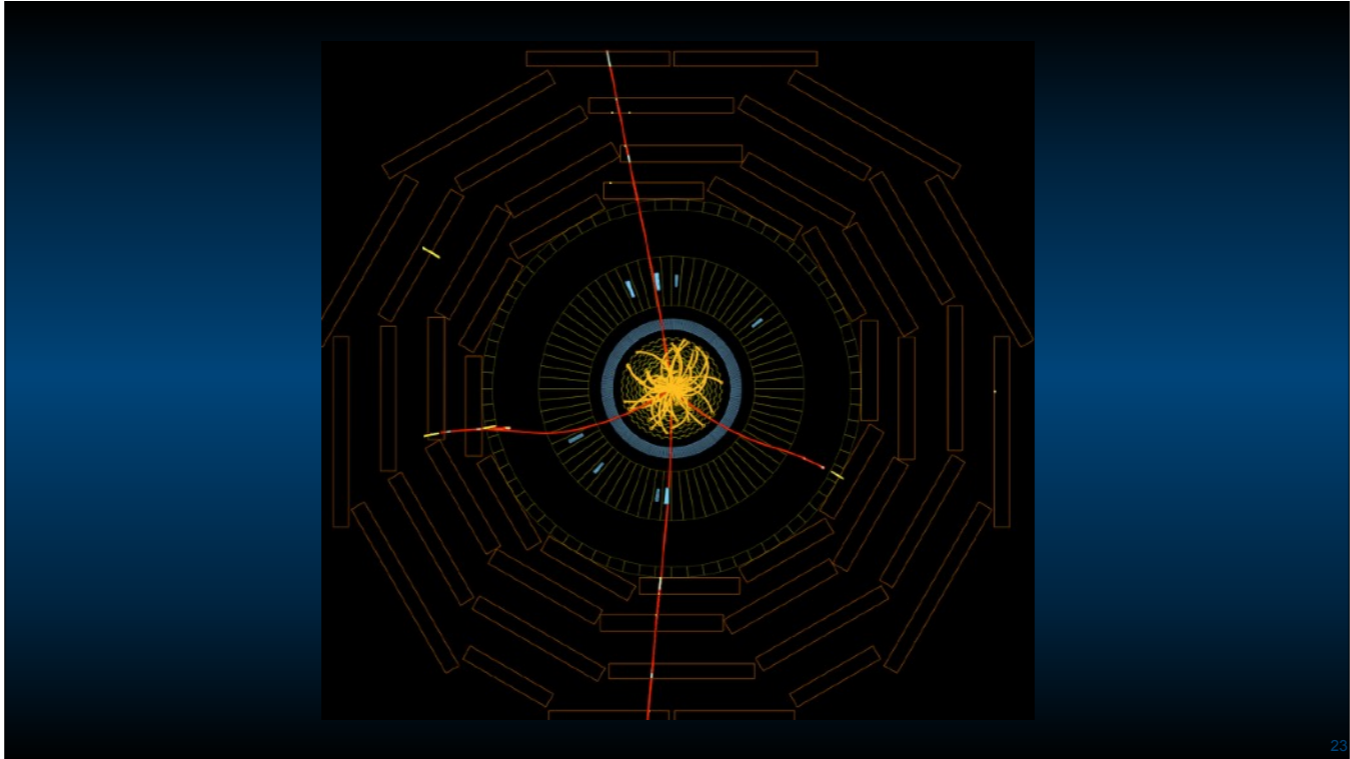






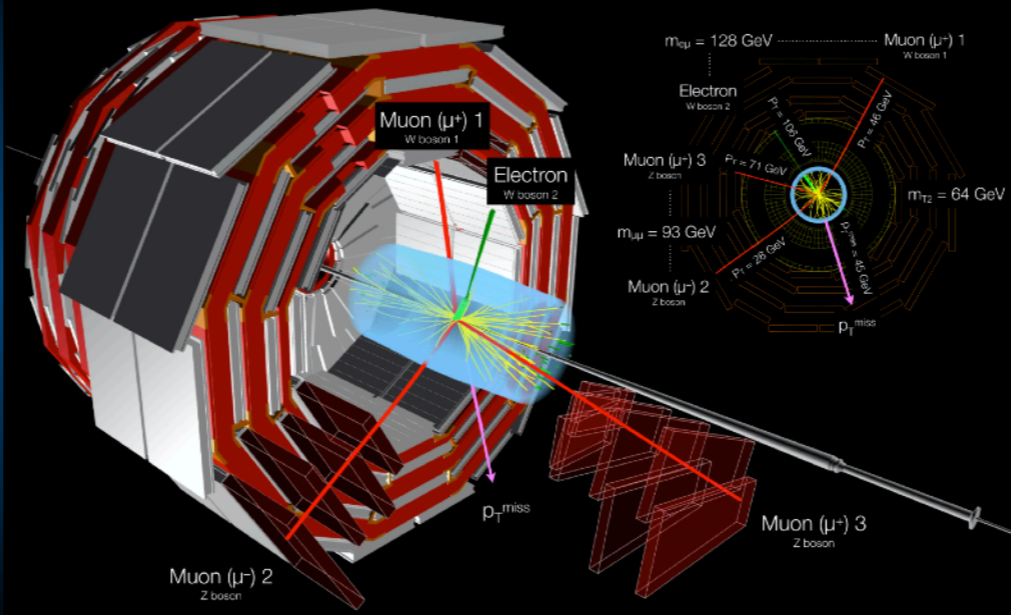


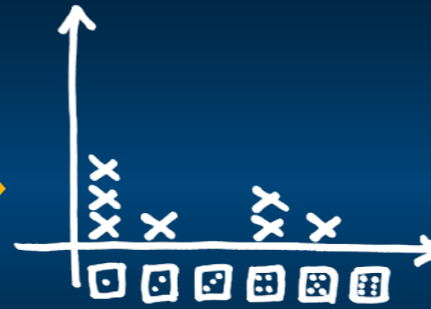




# WWZ → 4 lepton event

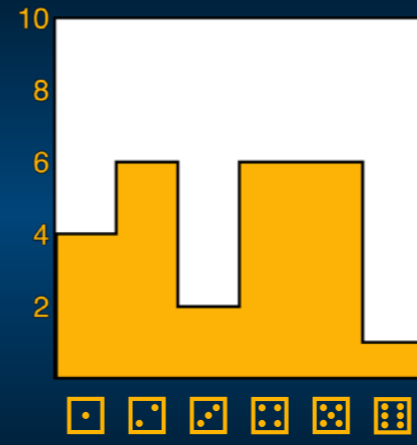
CMS experiment at the LHC, CERN  
Data recorded: 2016-Jul-23 08:13:27.898048 GMT  
Run 277168, Event No. 3219714497 LS 1799





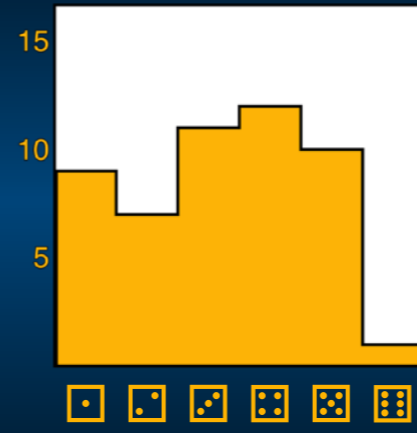


x25





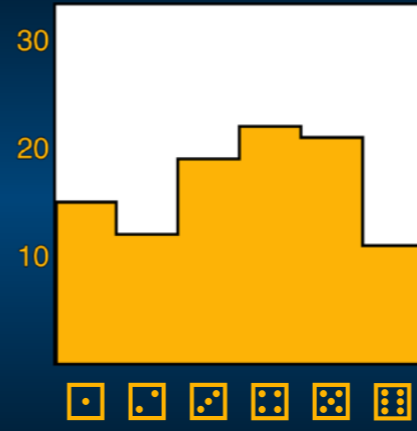
x50





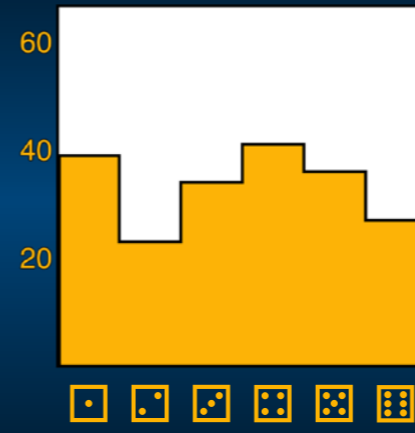


×100



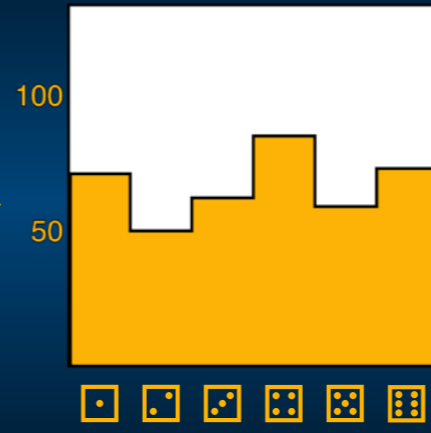


x200



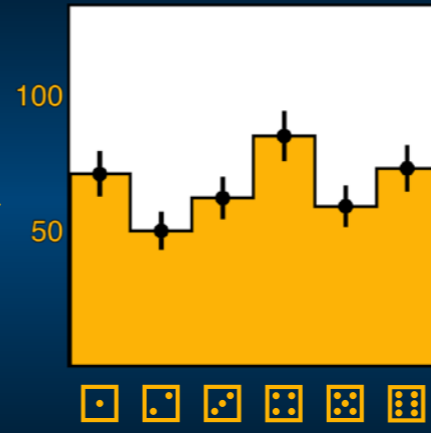


×400



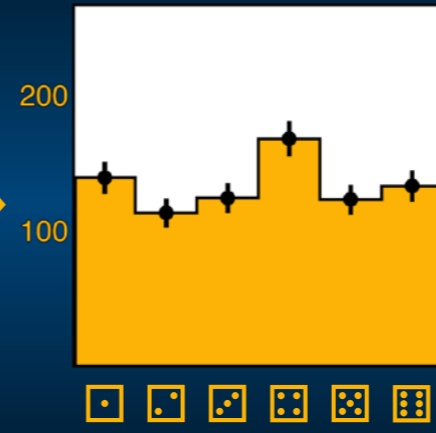


×400



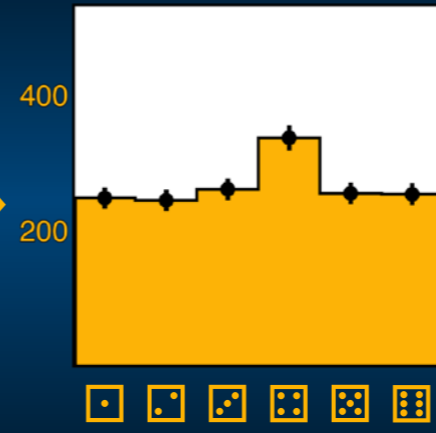


x800



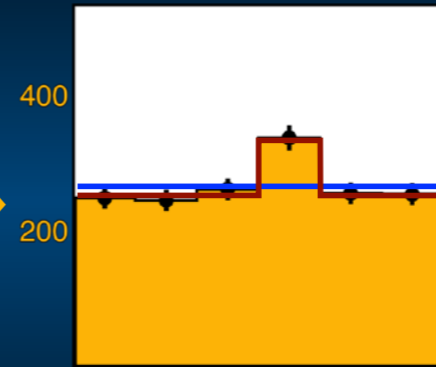


×1600





×1600







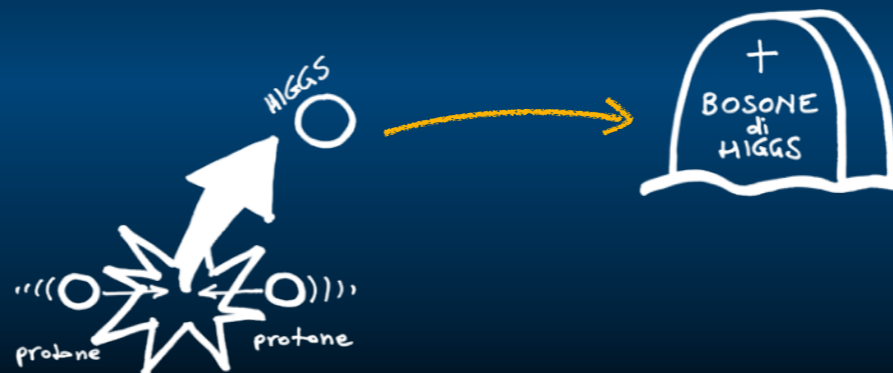
×1600

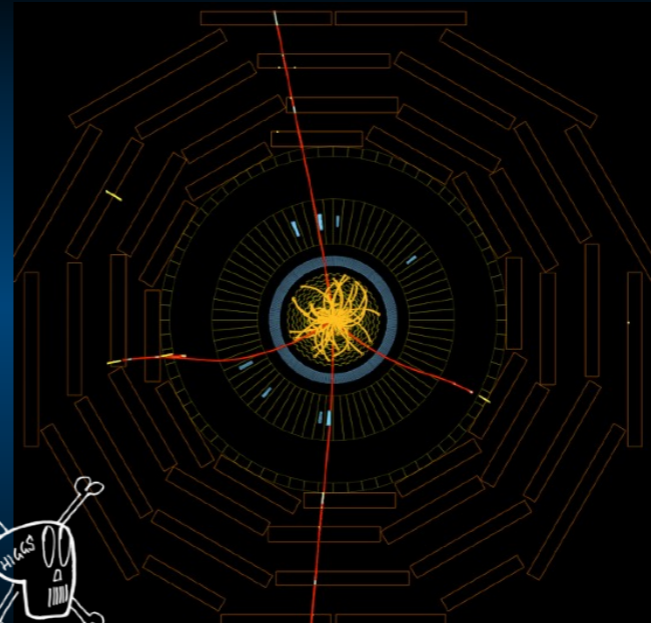
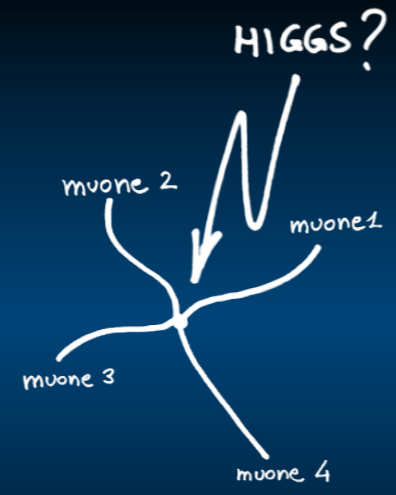


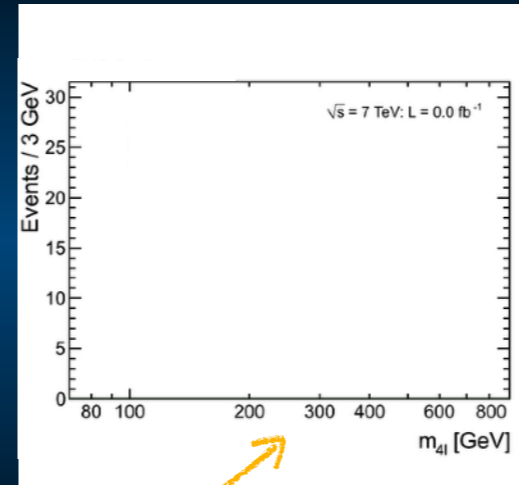
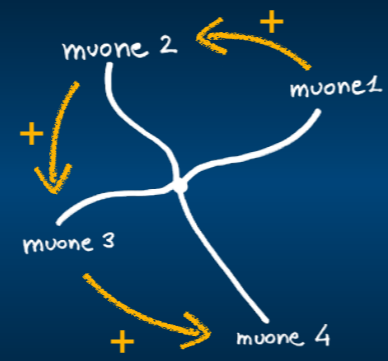


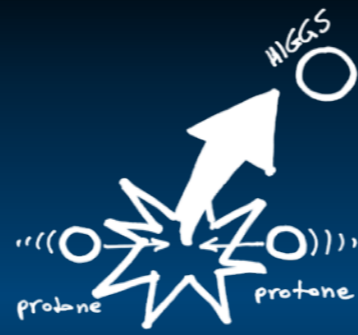
$$\sim \frac{1}{10\,000\,000\,000\,000\,000\,000\,000} \text{ s}$$

diecimila miliardi di miliardi...



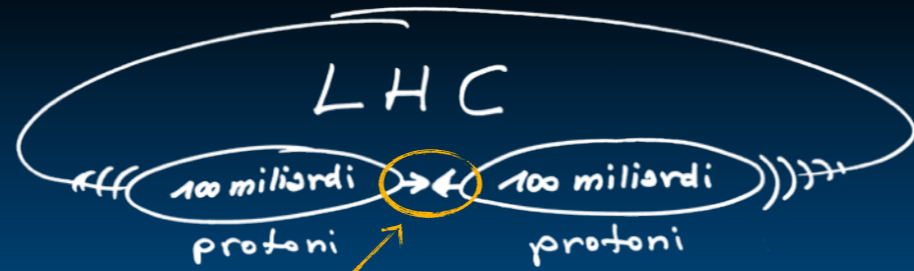




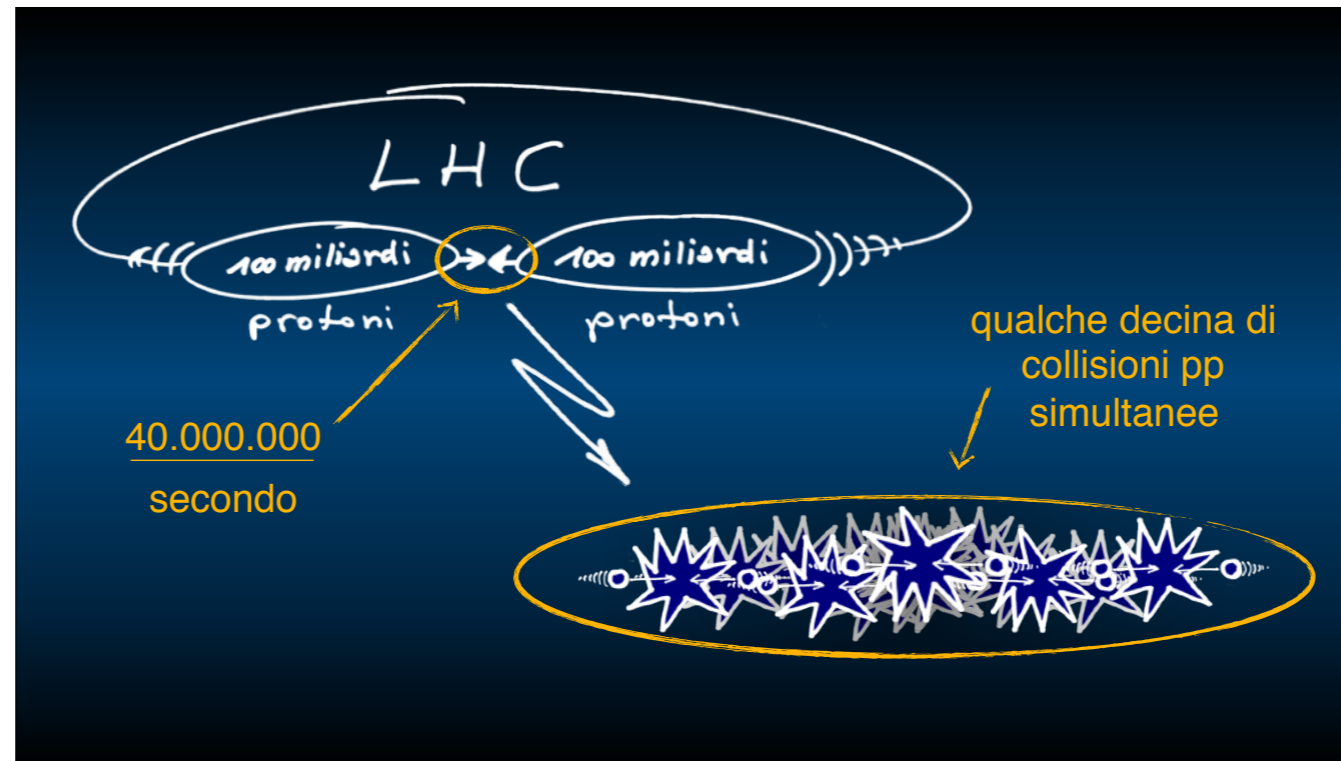


$$\frac{1}{622\,614\,630}$$

$$\sim \frac{1}{100\,000\,000\,000}$$



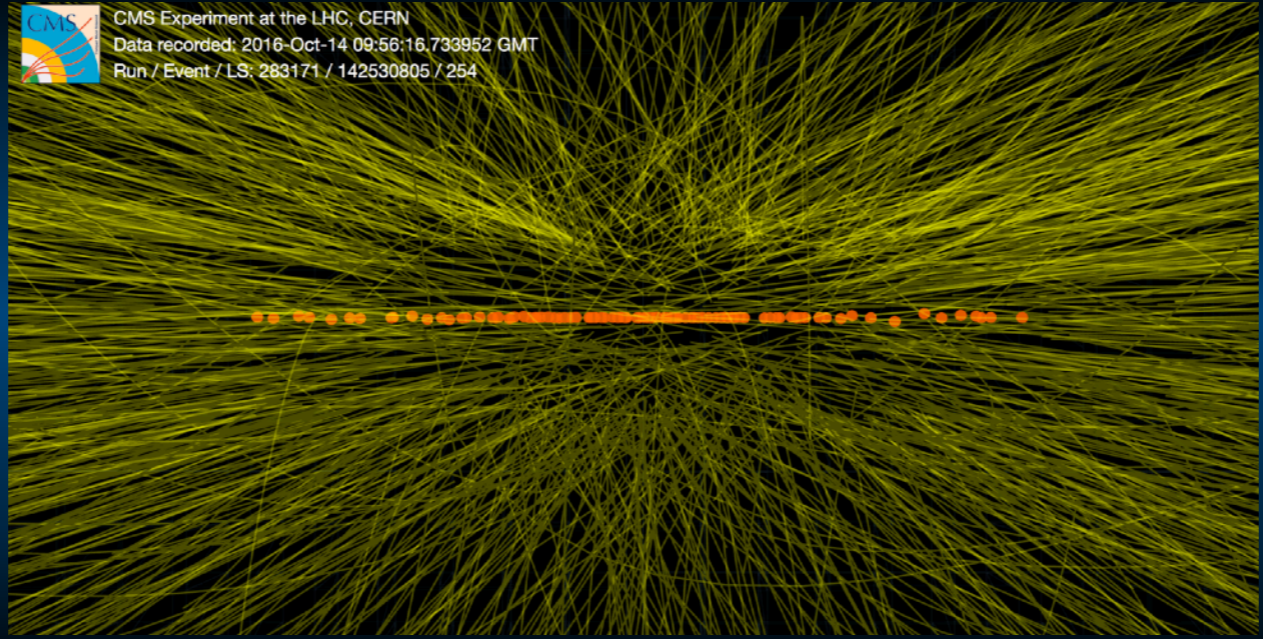
40.000.000  
secondo





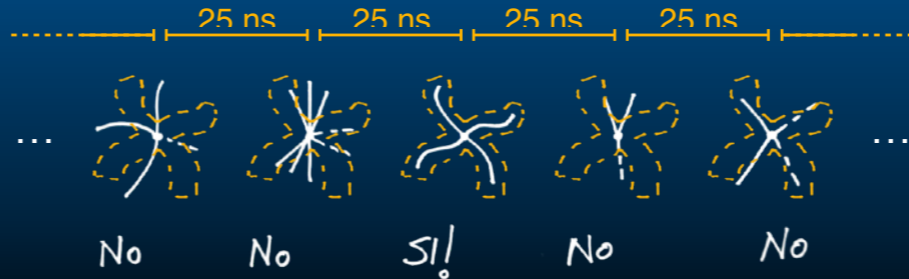


CMS Experiment at the LHC, CERN  
Data recorded: 2016-Oct-14 09:56:16.733952 GMT  
Run / Event / LS: 283171 / 142530805 / 254



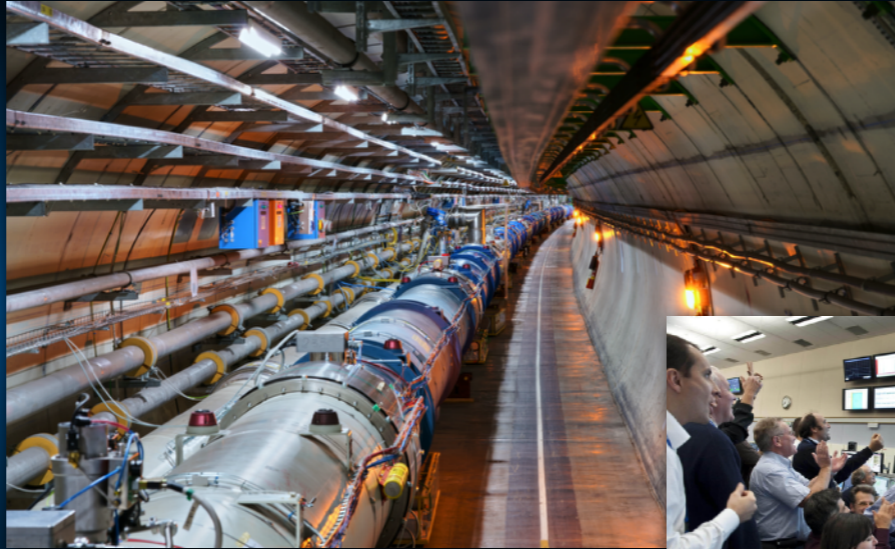


~140 Megapixel  
40 milioni di foto al secondo  
1000 foto al secondo  
memorizzate



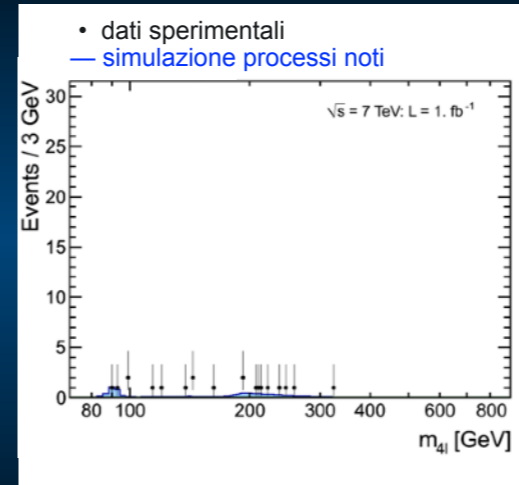


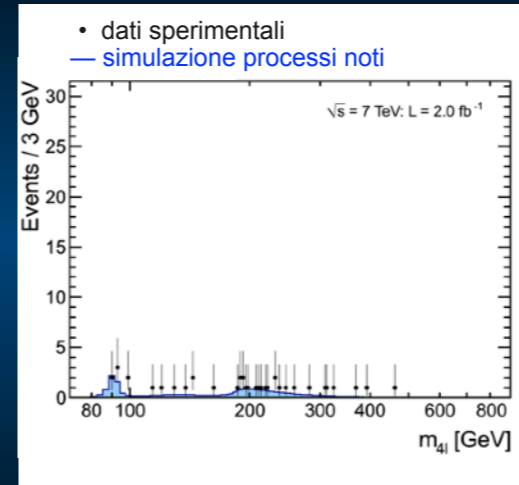
*INFN Bologna - Fine anni '70*



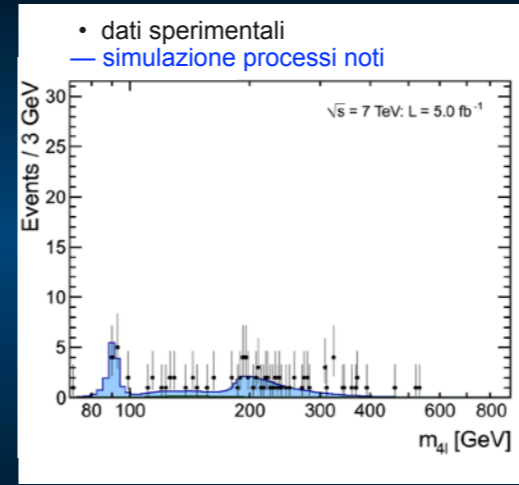
2009

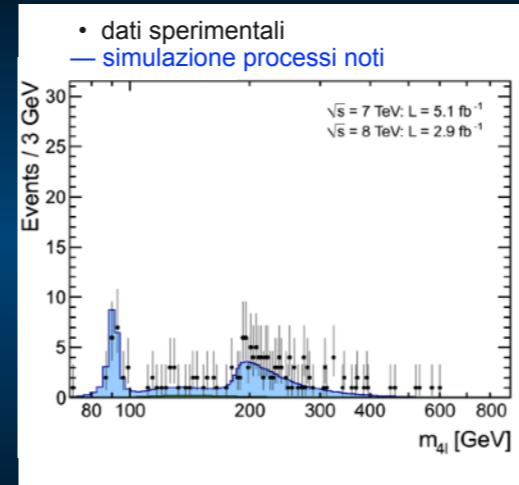


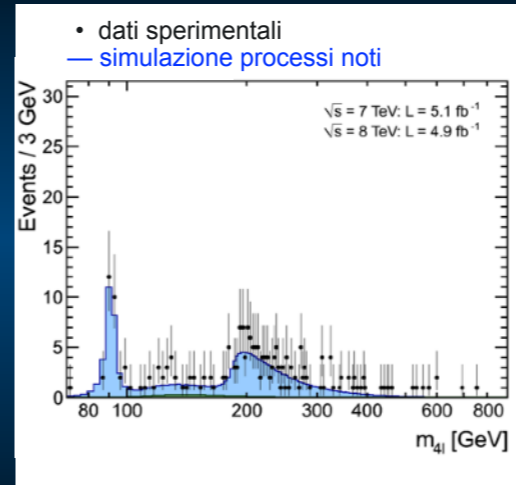


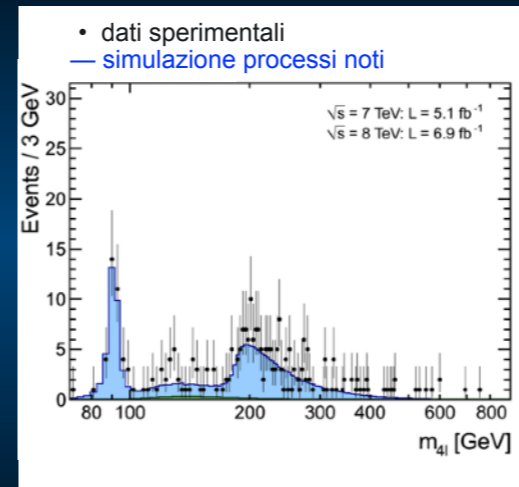


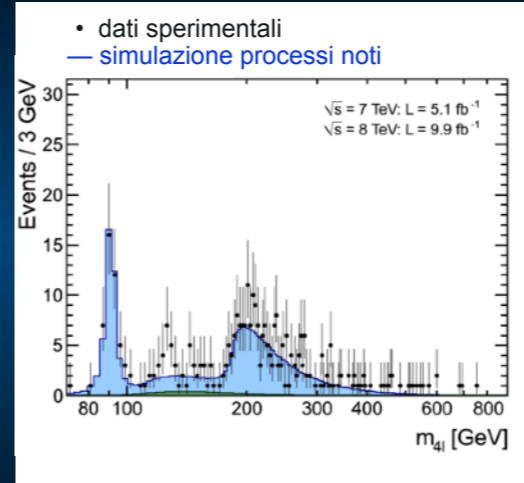


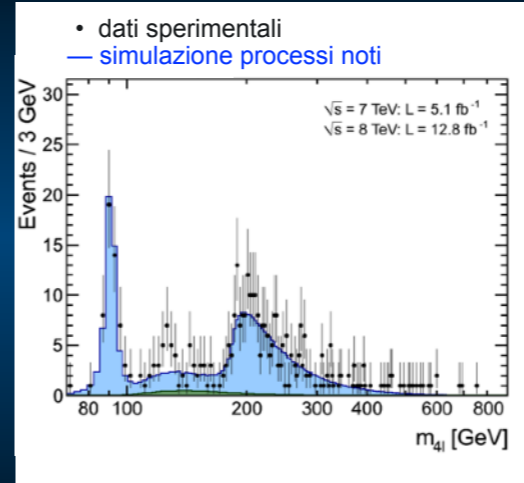


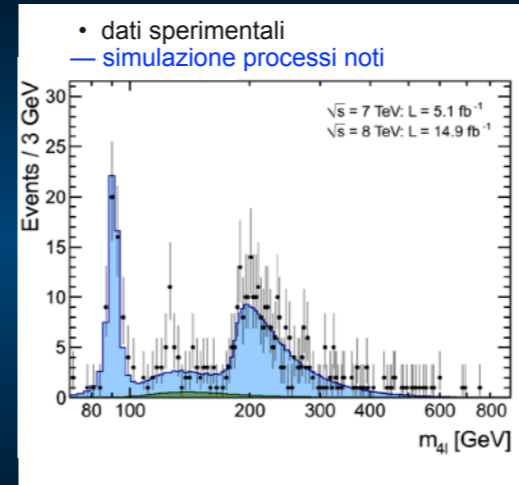


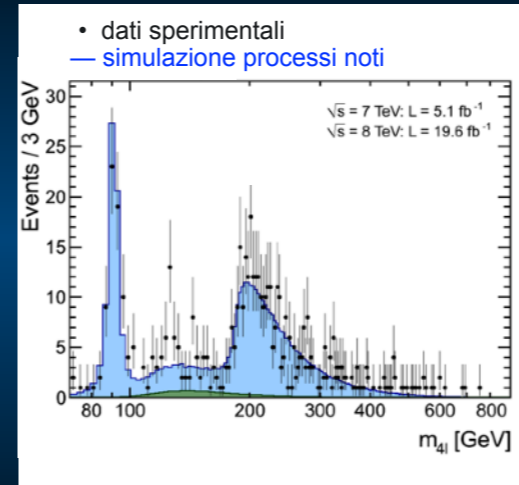














> 2 anni e...  
~ 2 000 000 000 000  
000

