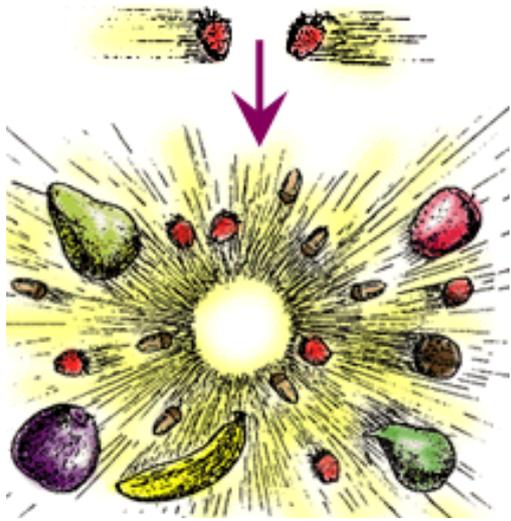
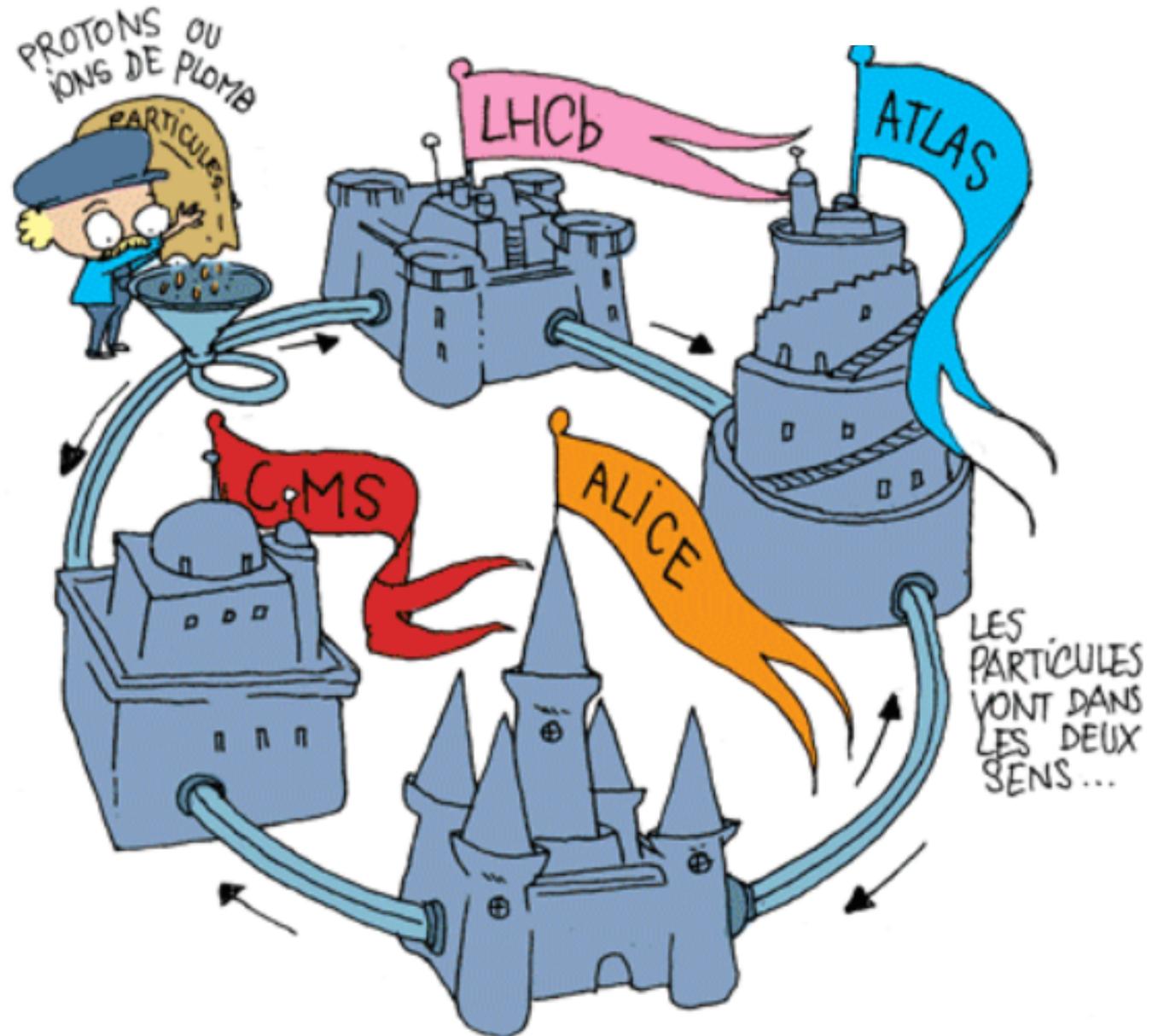
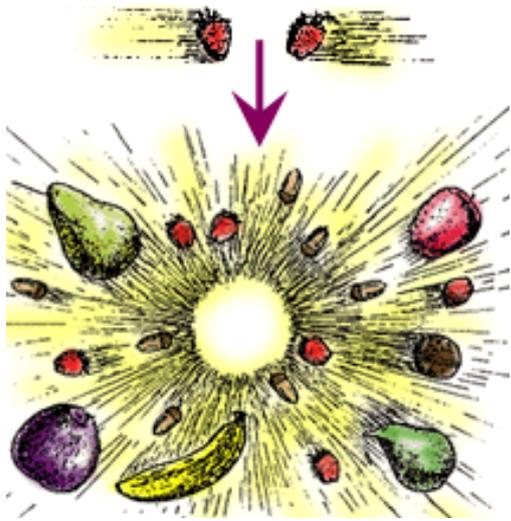


Accélérateur

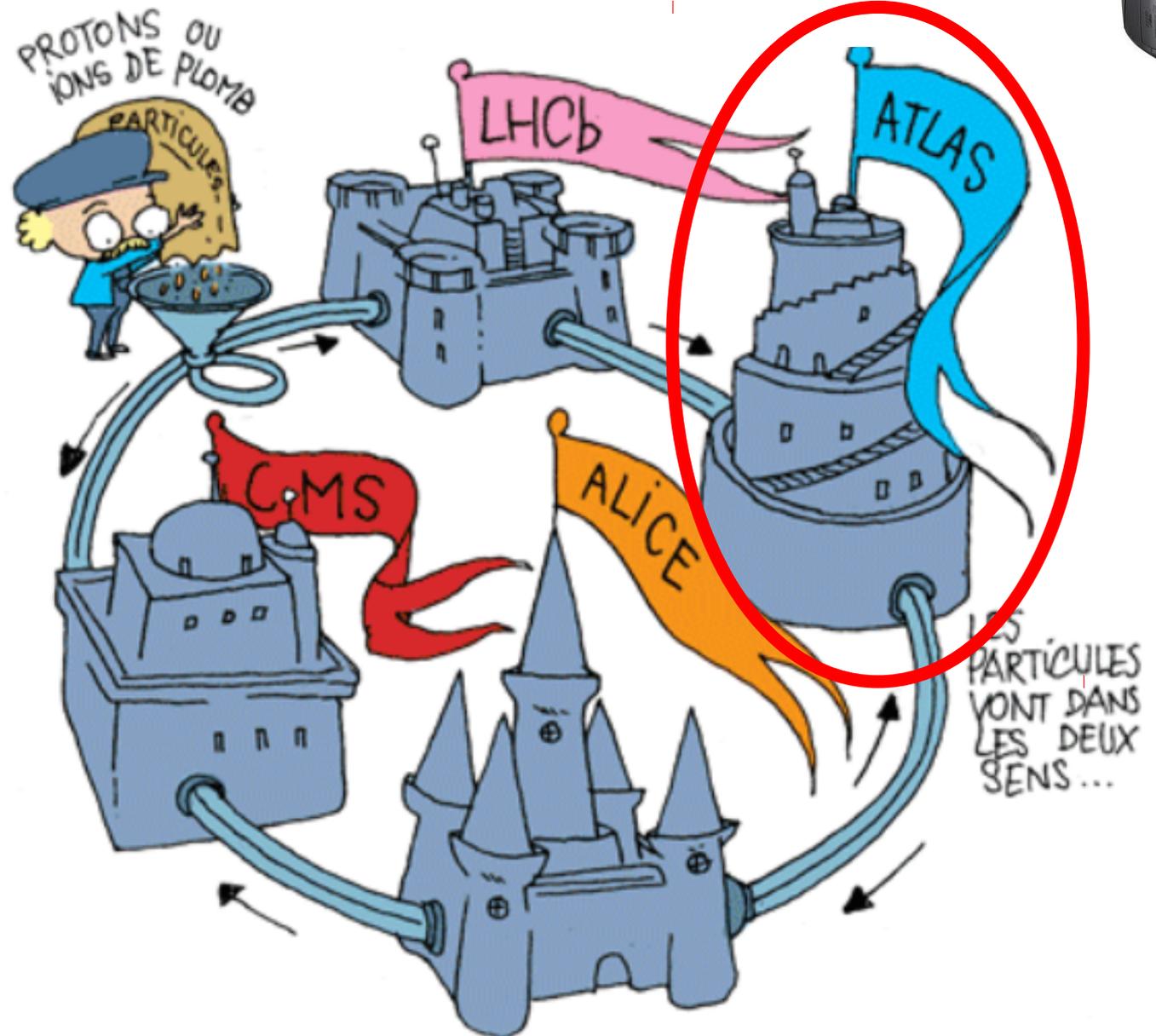
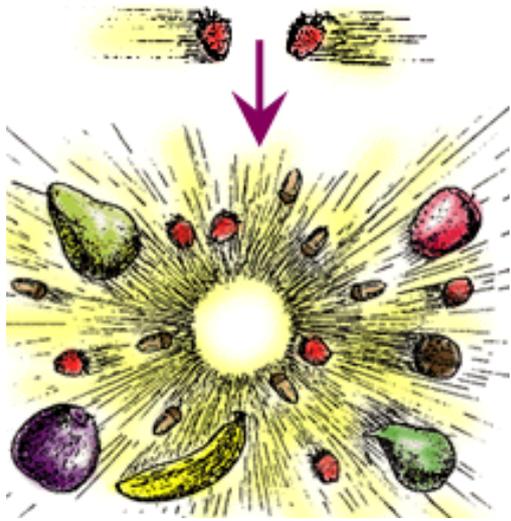


Large Hadron Collider : LHC, CERN(CH)

Détecteur(s)



Détecteur(s)



$$\vec{F} = q\vec{v} \times \vec{B}$$

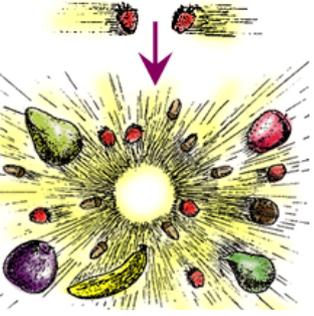
q=+1

q=-1

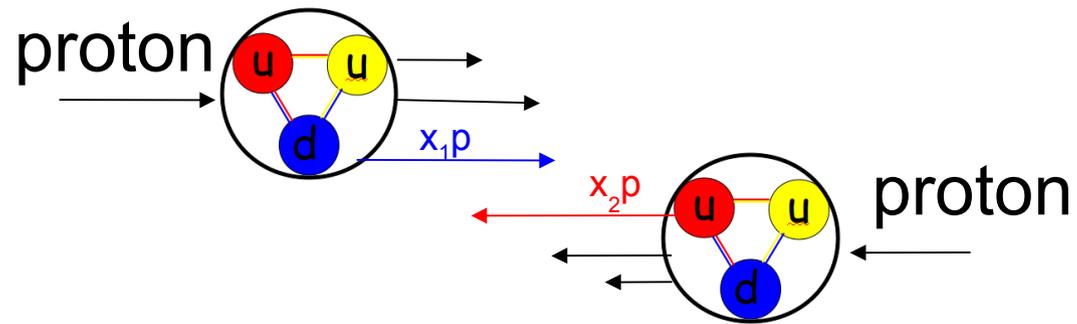


Conservation de la charge électrique



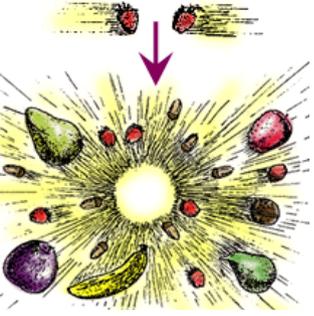


Large Hadron Collider (LHC) CERN

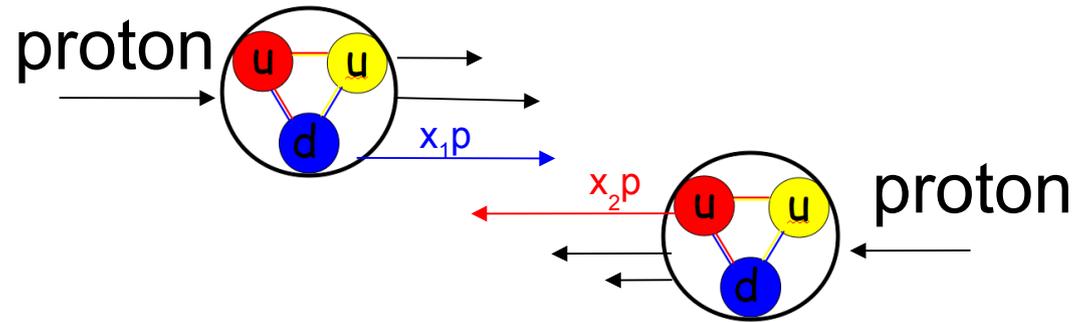


$$E=mc^2$$

matière (proton) → Énergie → matière (W^+ ou W^-)

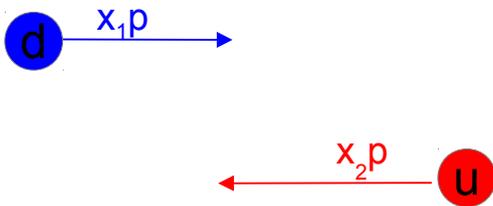


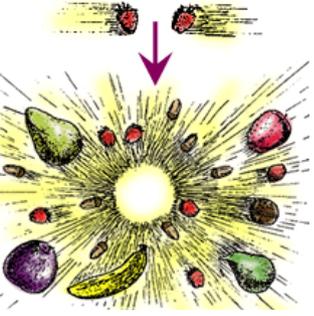
Large Hadron Collider (LHC) CERN



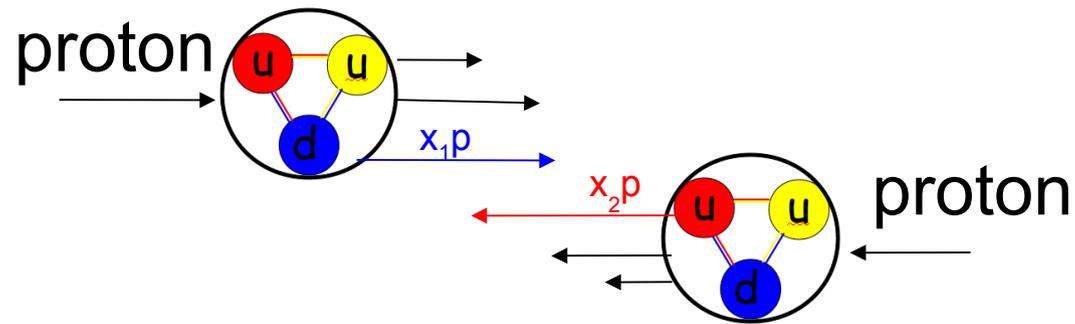
$$E=mc^2$$

matière (proton) → Énergie → matière (W^+ ou W^-)



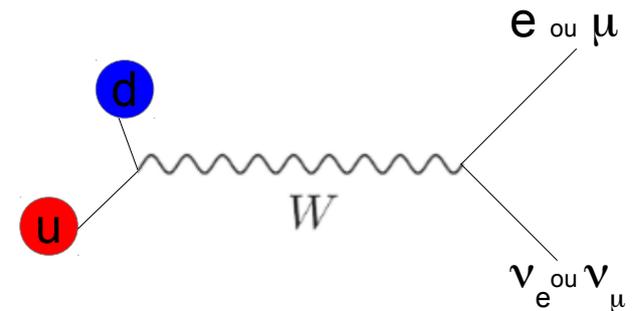


Large Hadron Collider (LHC) CERN

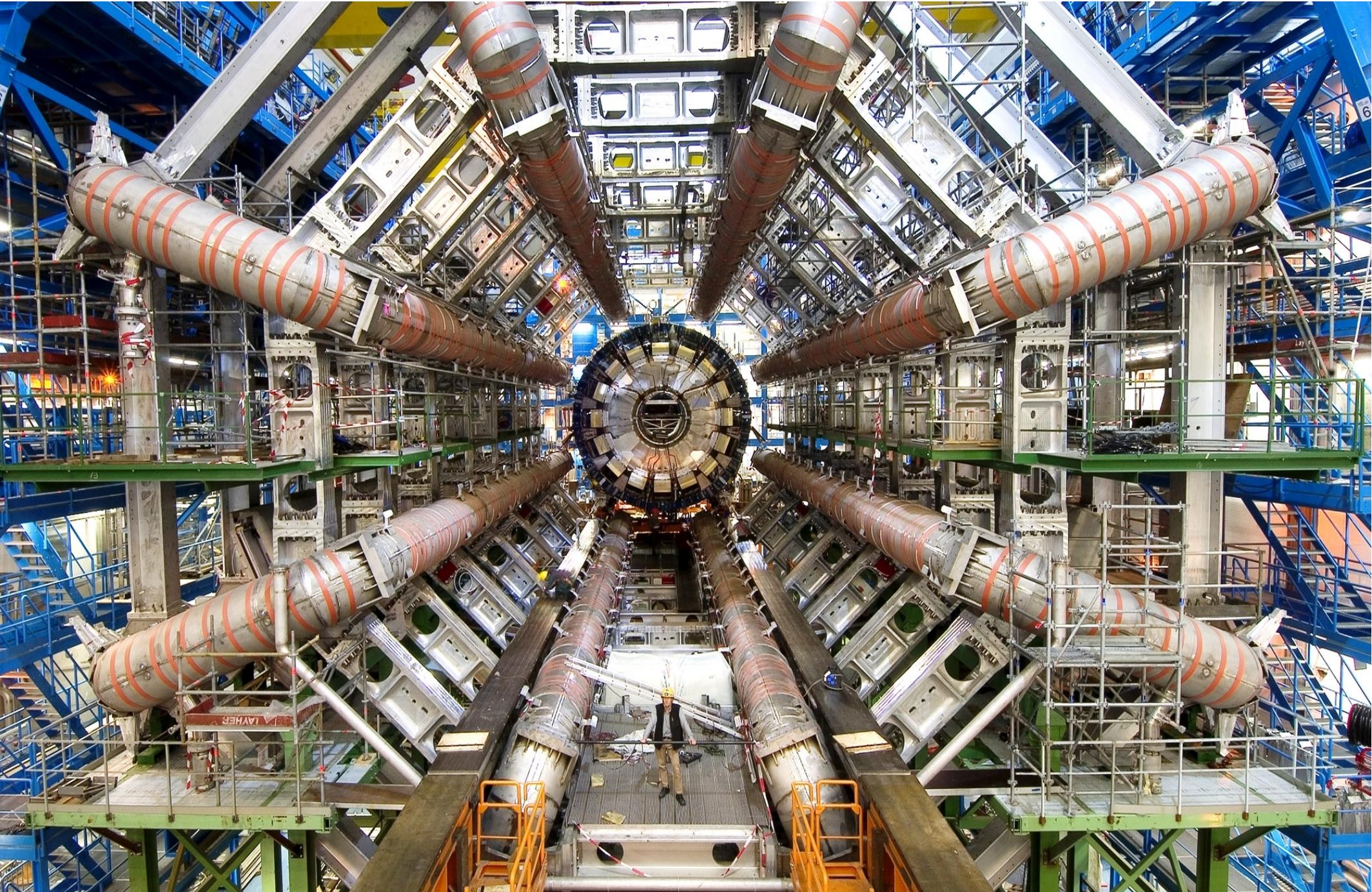


$$E=mc^2$$

matière (proton) → Énergie → matière (W^+ ou W^-)

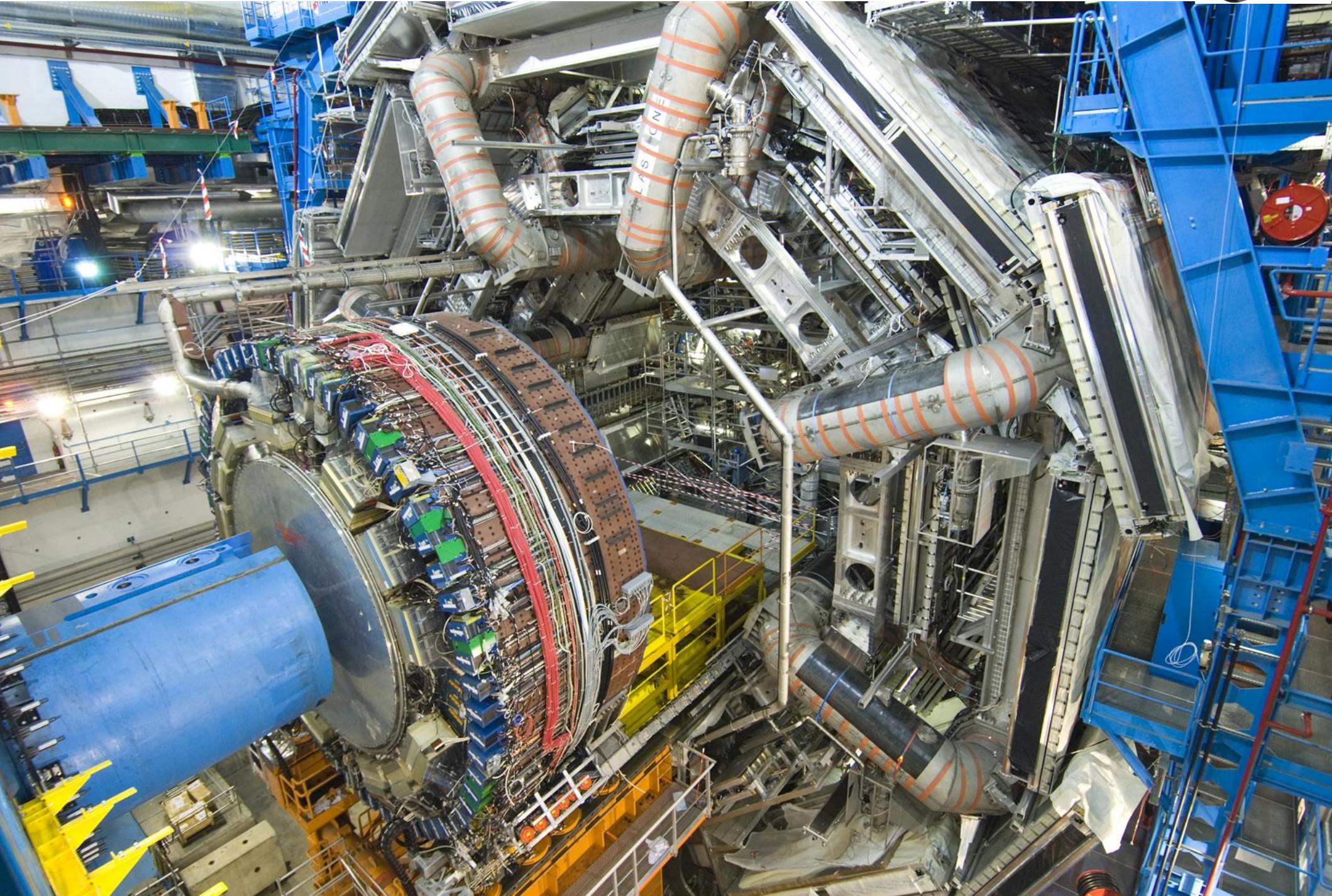


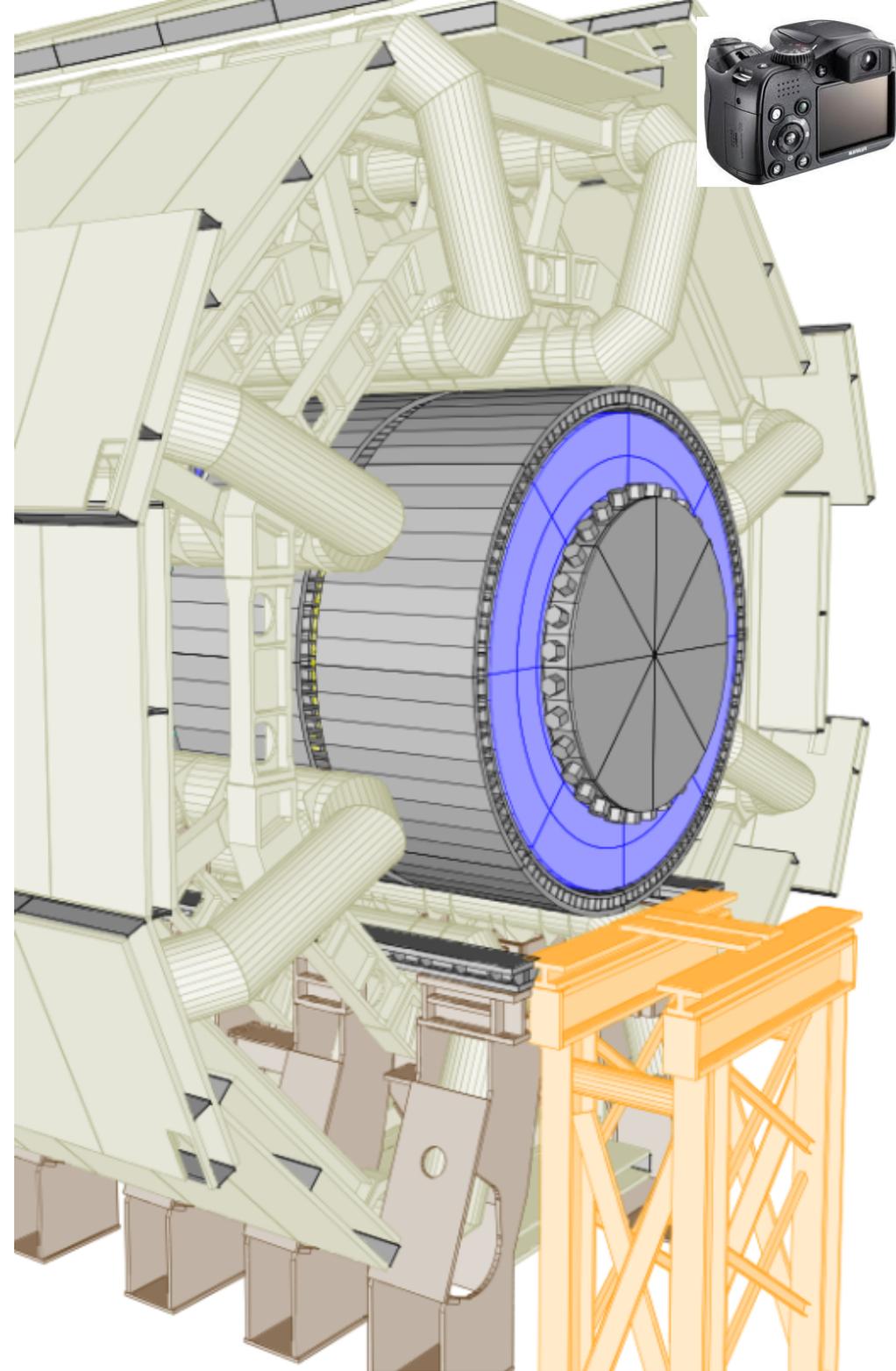
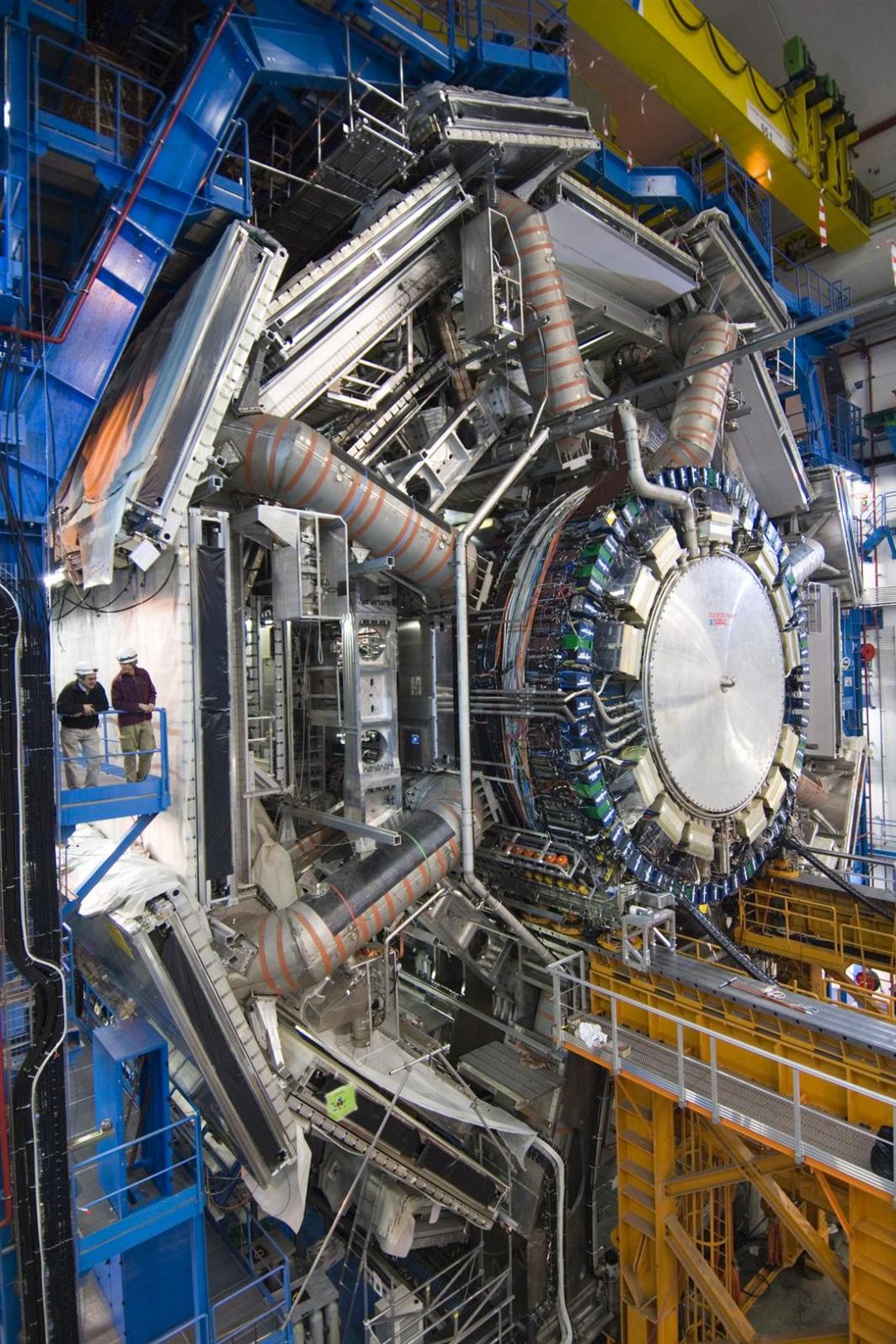
Détecteur ATLAS



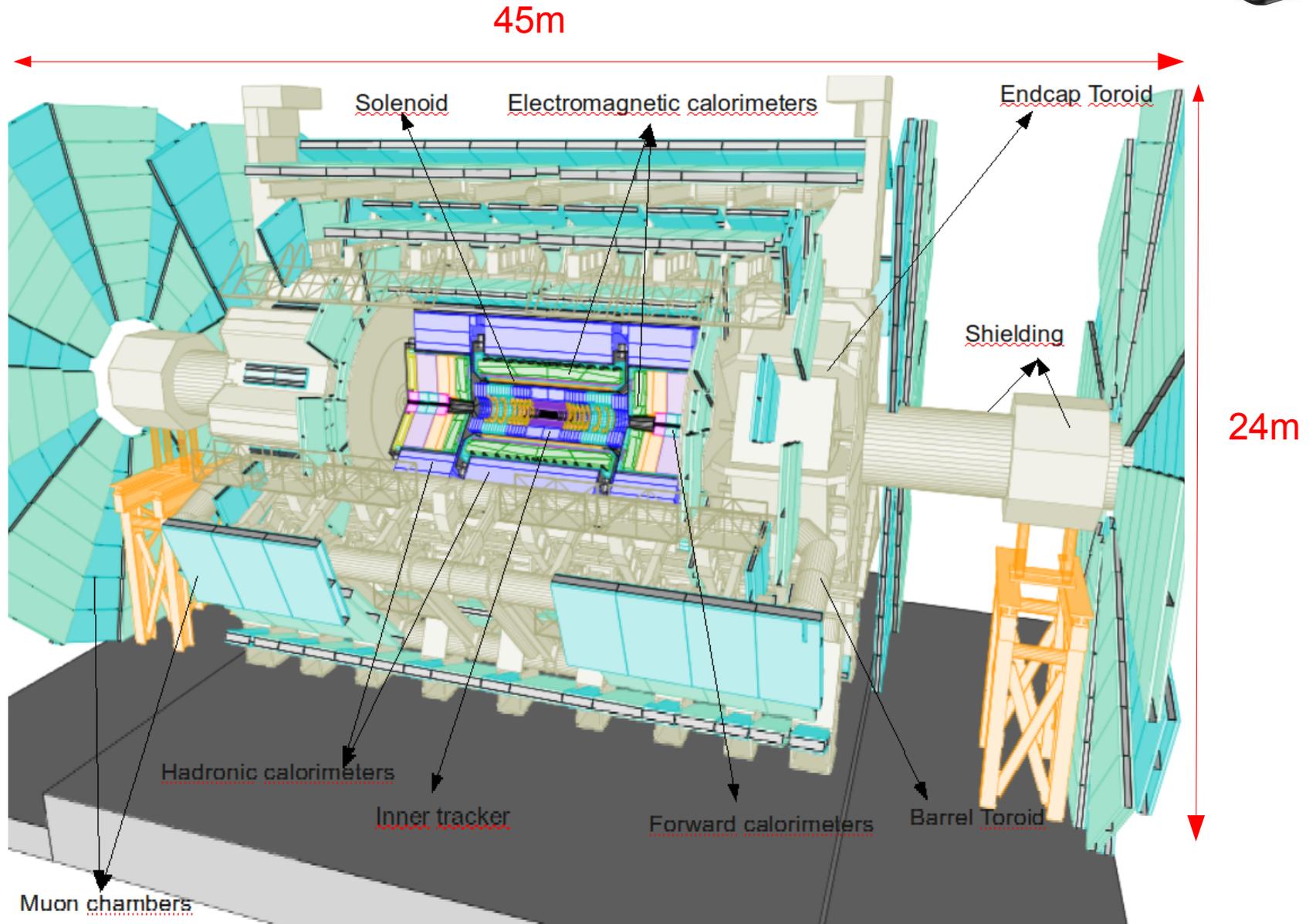
Principe d'un détecteur





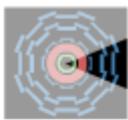


~90 000 000 pixels



ATLAS

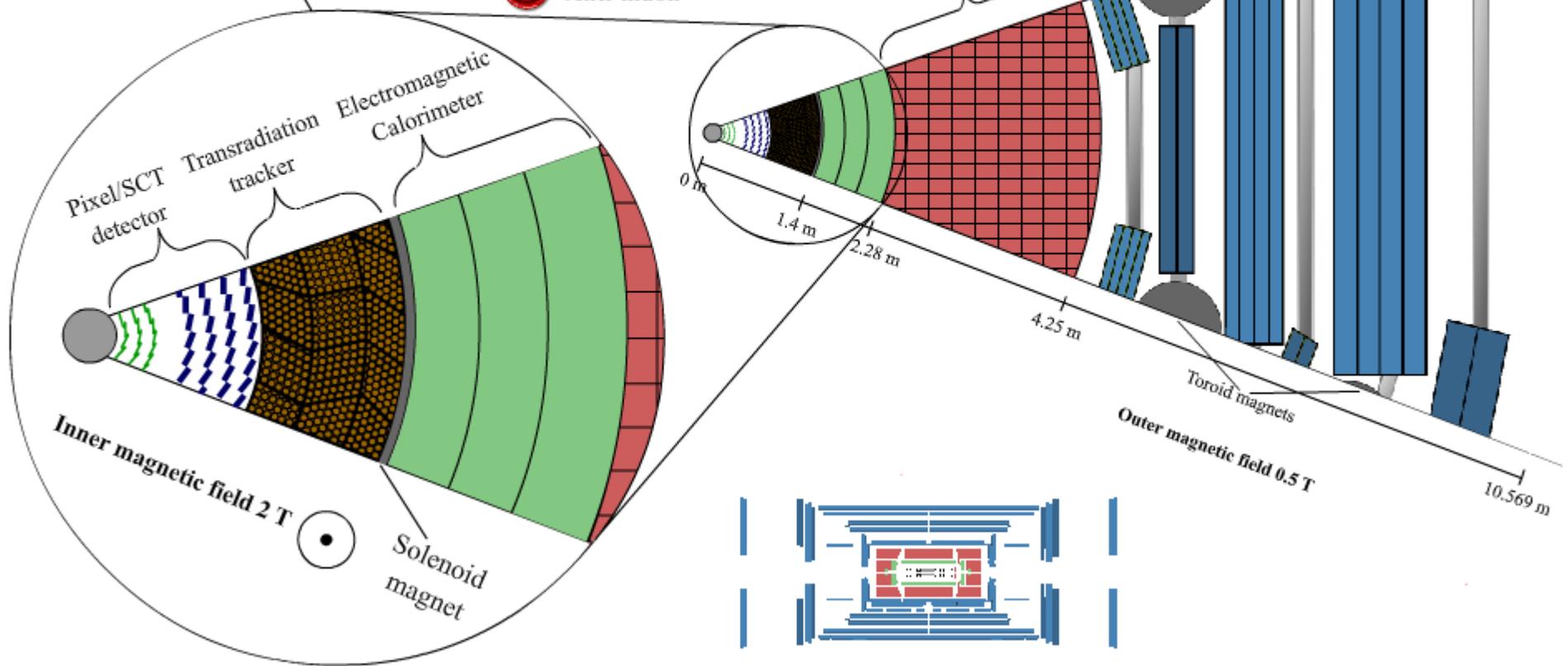
animation



display instantl

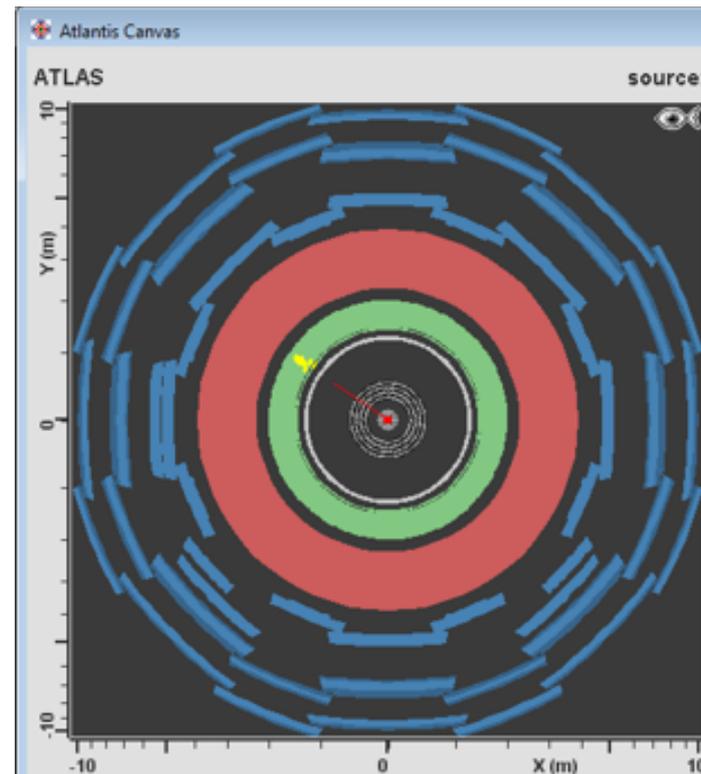
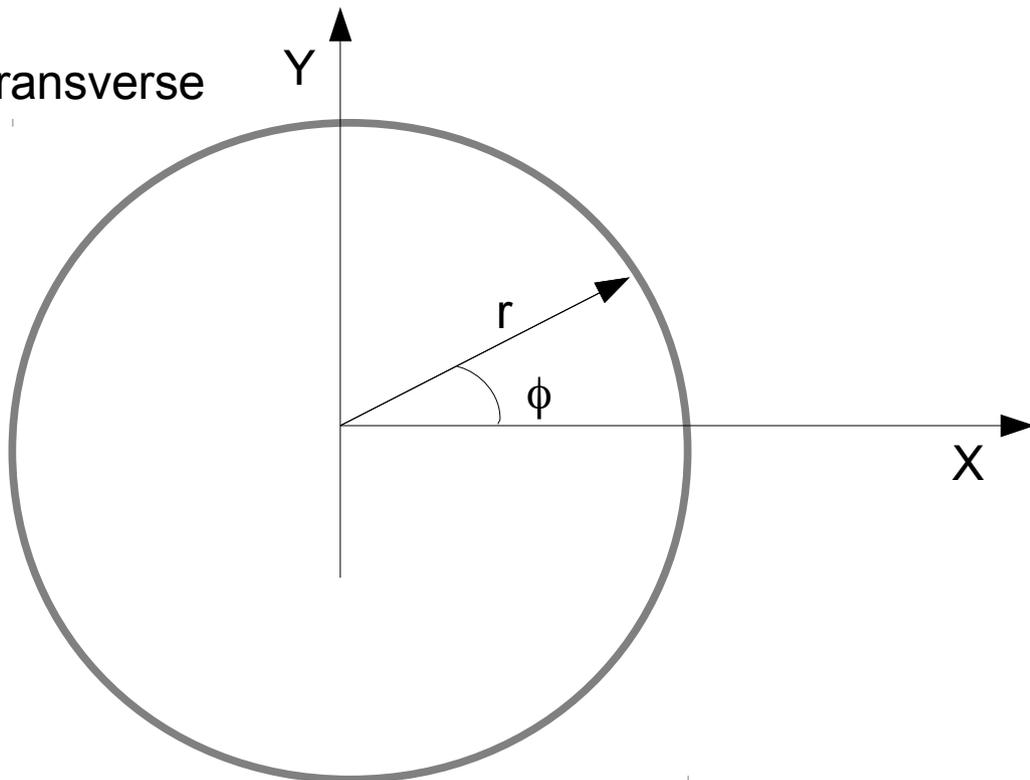
- Electron
- Proton
- Neutrino
- Photon
- Positron
- Anti-proton
- Jets
- Muon
- Neutron
- Anti-muon

Magnification 3x

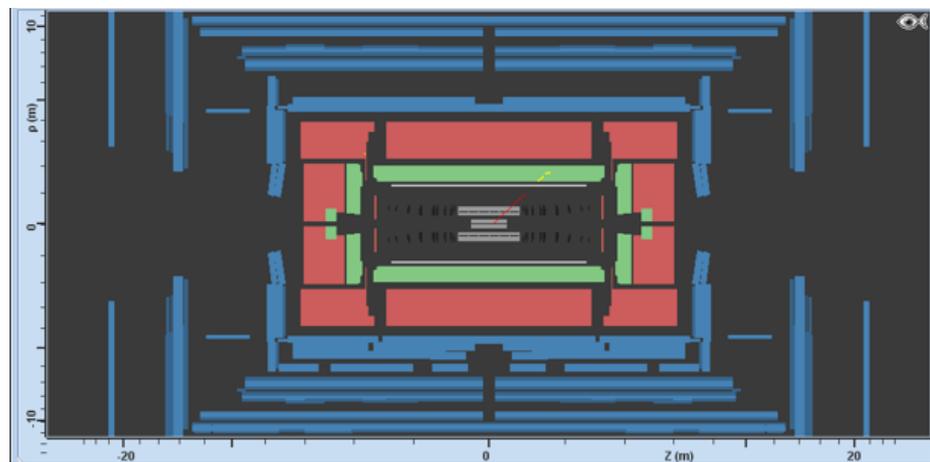
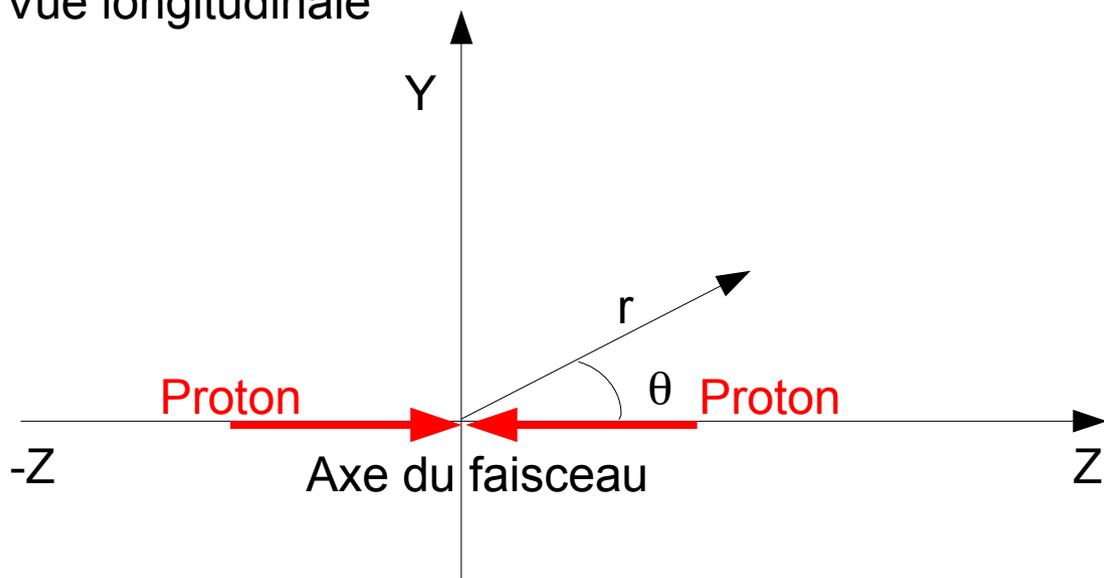


Created by T. Herrmann, O. Jeřábek, K. Jende, M. Kobel

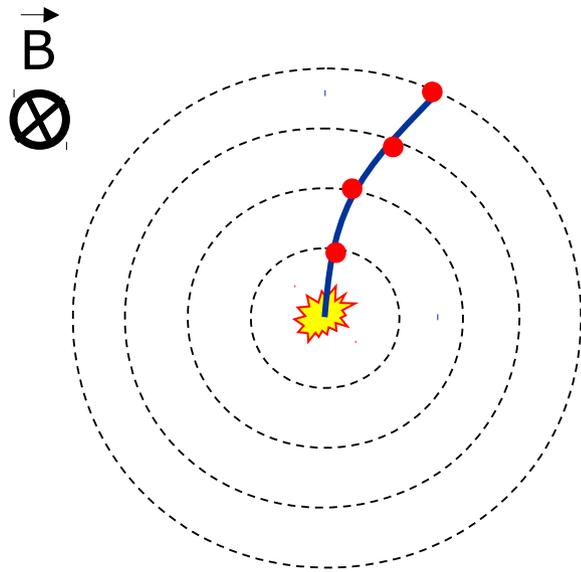
Vue transverse



Vue longitudinale

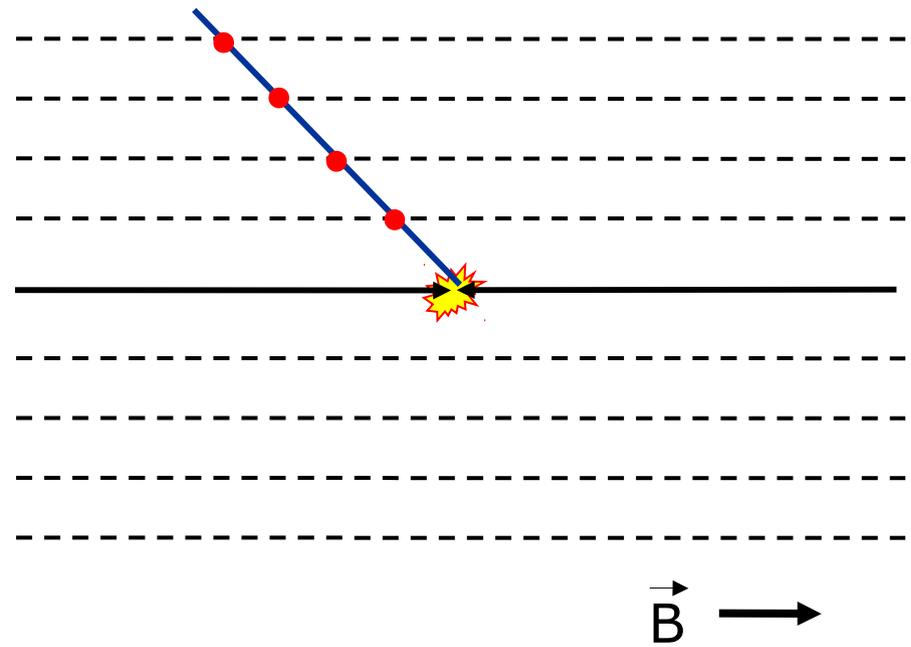


Vue transverse

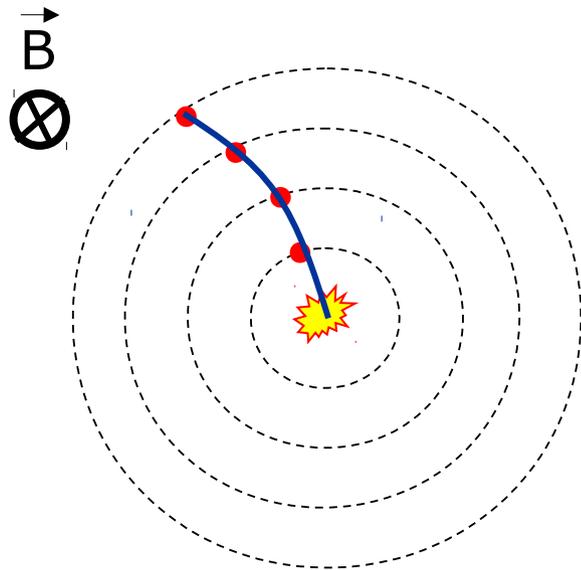


Un électron

Vue longitudinale

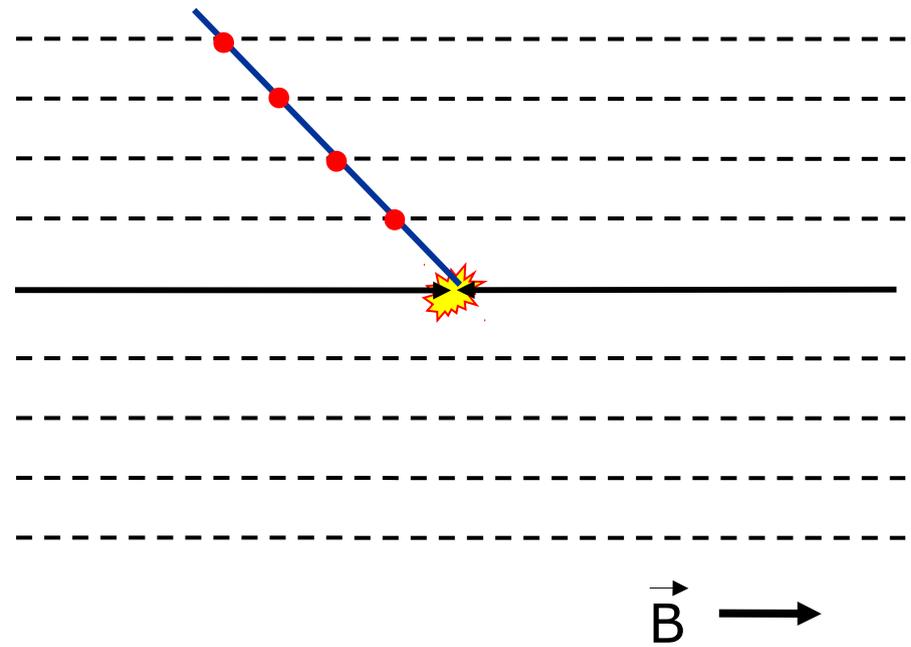


Vue transverse



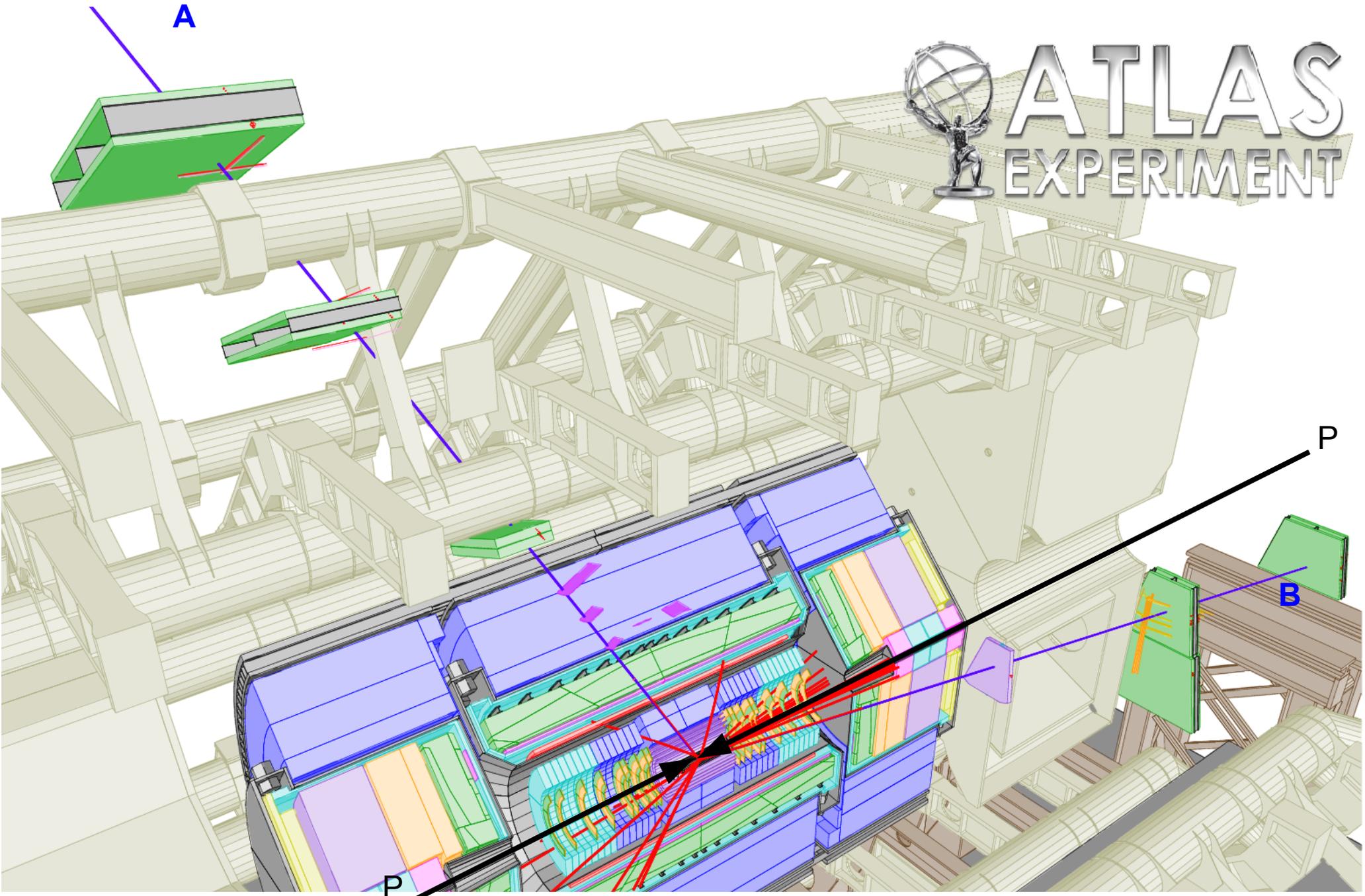
Un positon

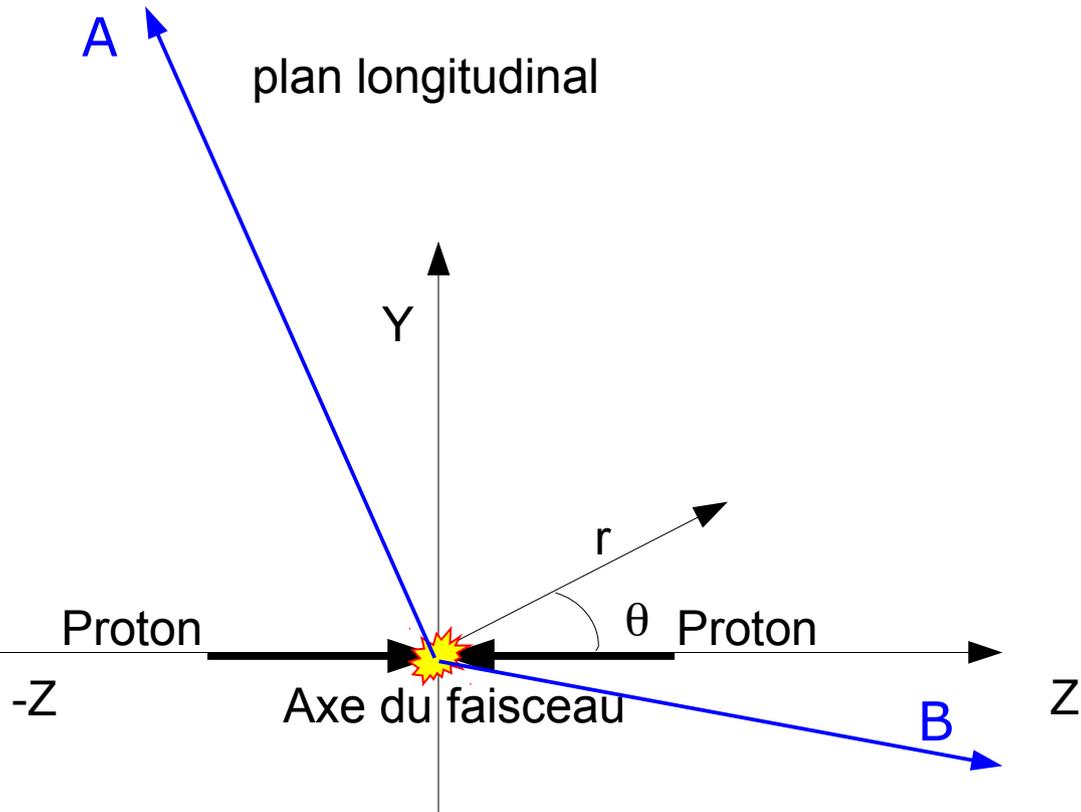
Vue longitudinale





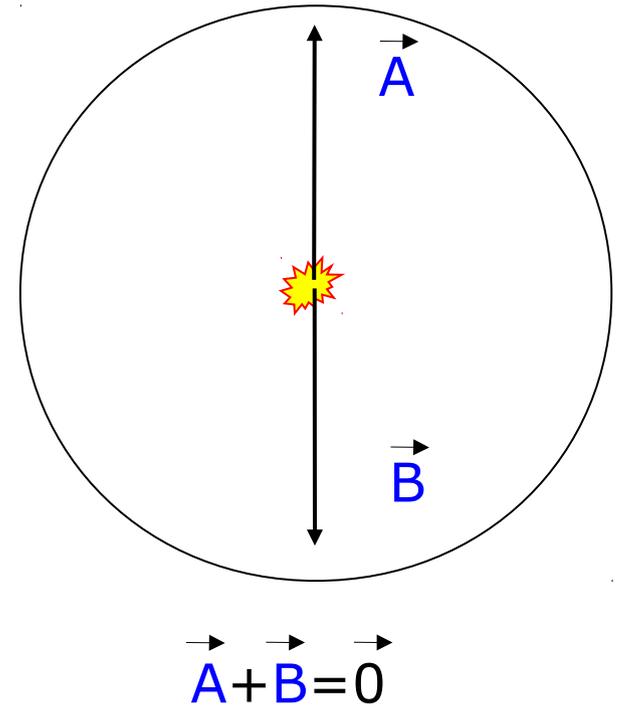
ATLAS EXPERIMENT



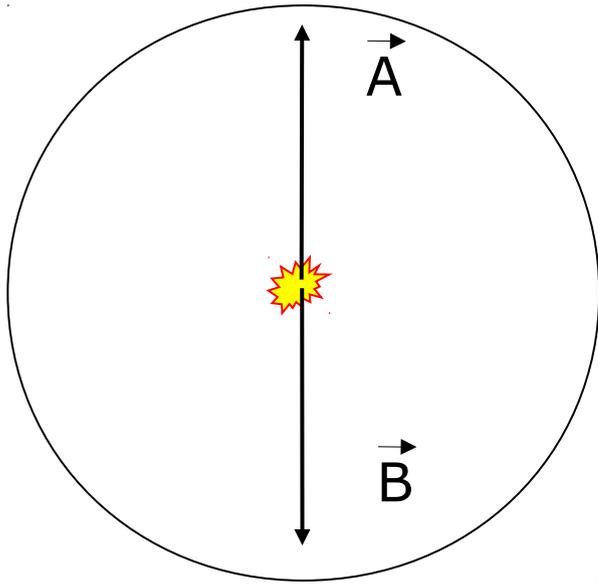


Quantité de mouvement ($p=mv$) = **impulsion**

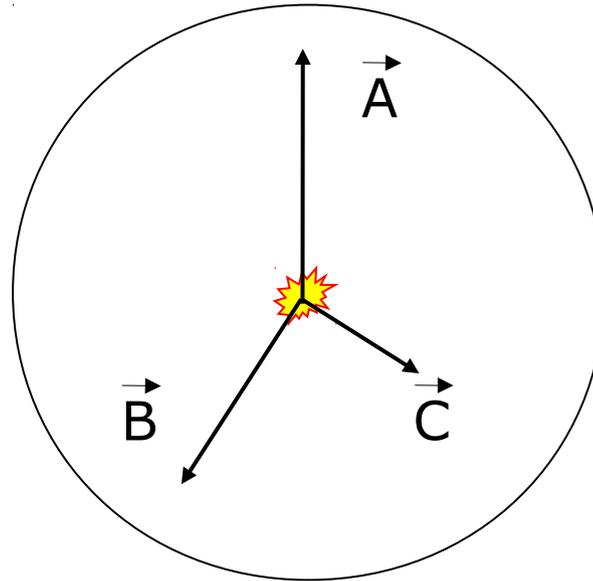
plan transverse



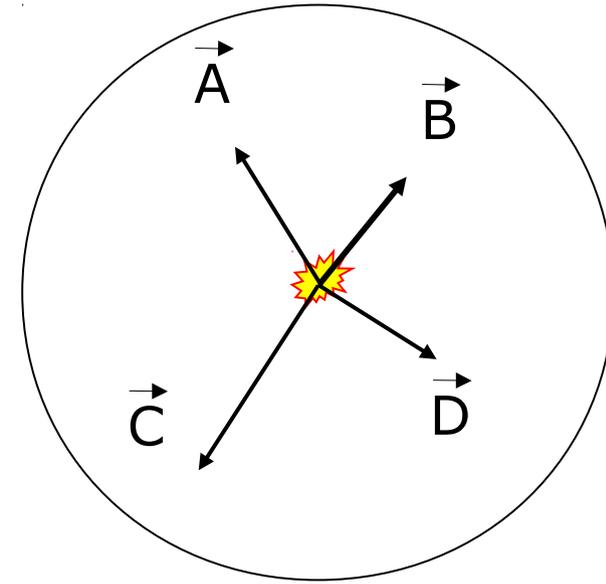
Conservation de l'impulsion dans le plan transverse au faisceau



$$\vec{A} + \vec{B} = 0$$

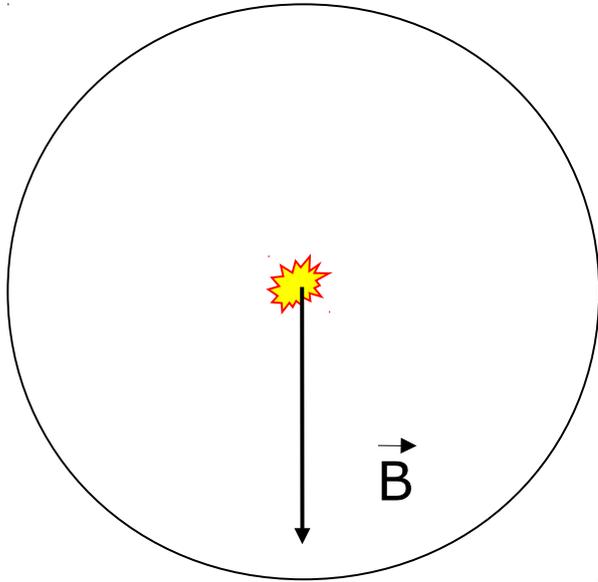


$$\vec{A} + \vec{B} + \vec{C} = 0$$

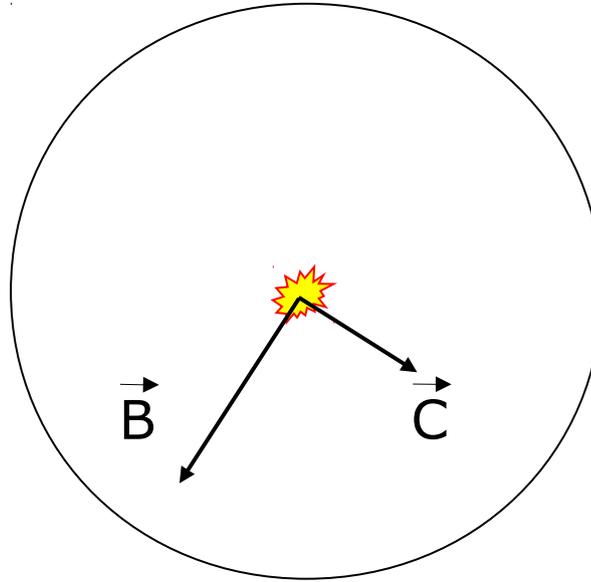


$$\vec{A} + \vec{B} + \vec{C} + \vec{D} = 0$$

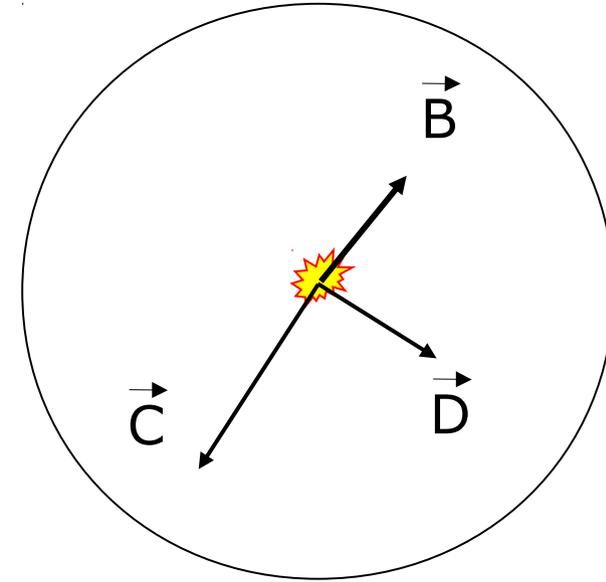
Énergie Manquante (MET)



$$\vec{B} \neq 0$$



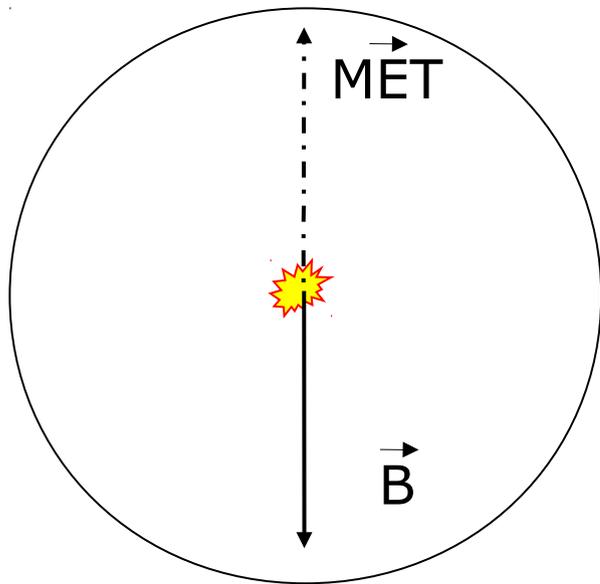
$$\vec{B} + \vec{C} \neq 0$$



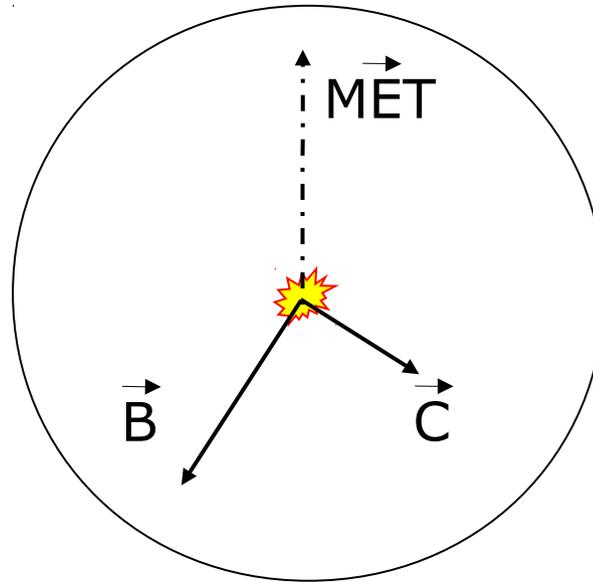
$$\vec{B} + \vec{C} + \vec{D} \neq 0$$

Le neutrino ne laisse pas de trace dans le détecteur interne (neutre) et ne dépose pas d'énergie dans le calorimètre (interagit très faiblement avec la matière)

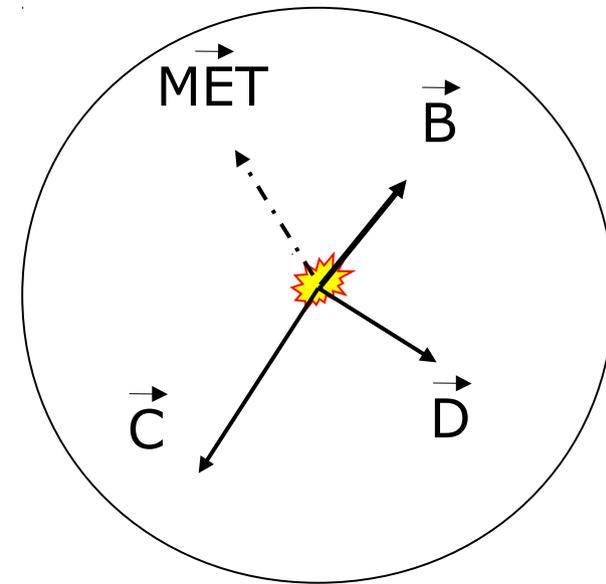
Si la particule A est un neutrino l'impulsion dans le plan transverse au faisceau ne semble plus être conservée



$$\vec{B} = -\vec{MET}$$



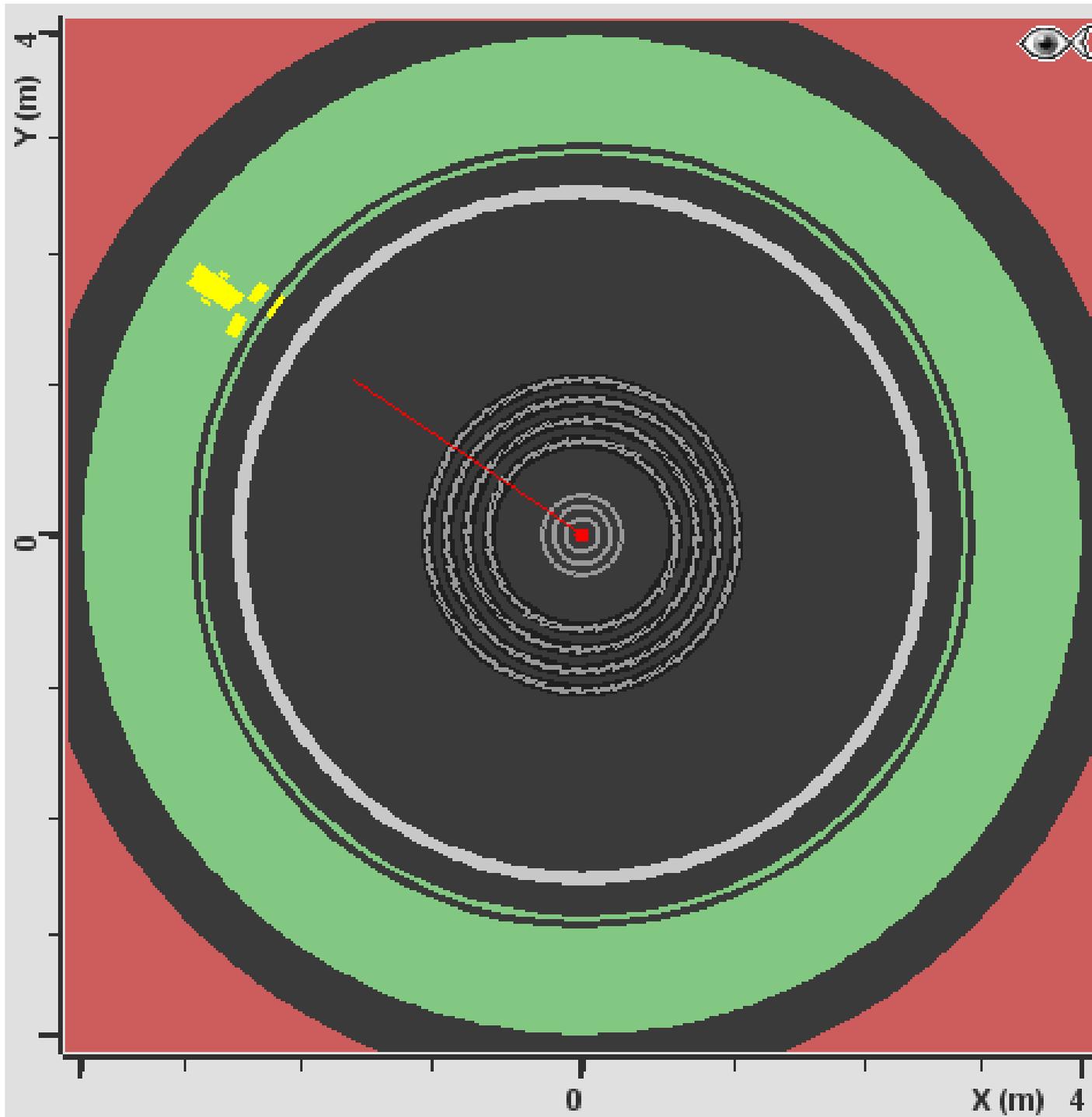
$$\vec{B} + \vec{C} = -\vec{MET}$$

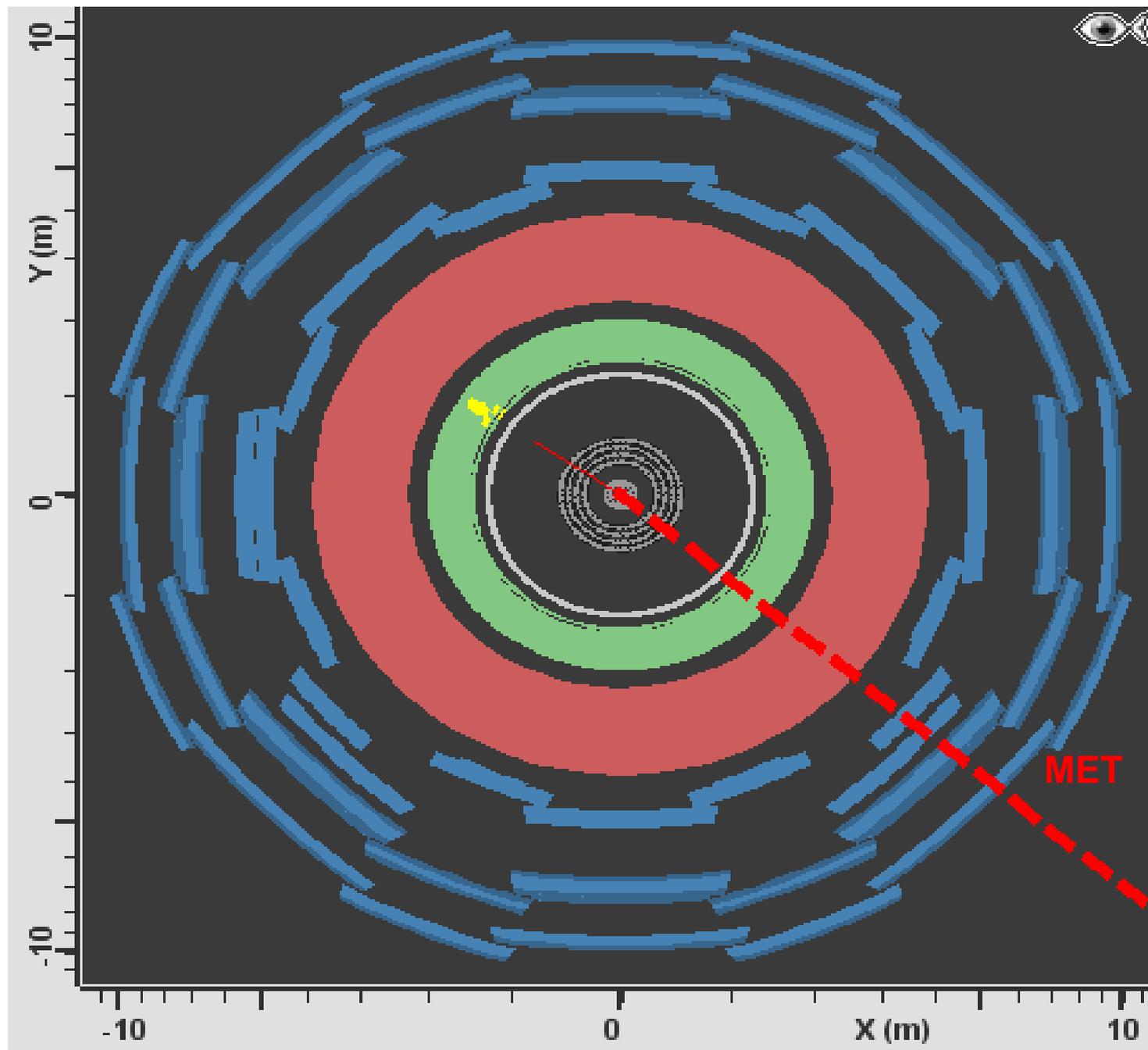


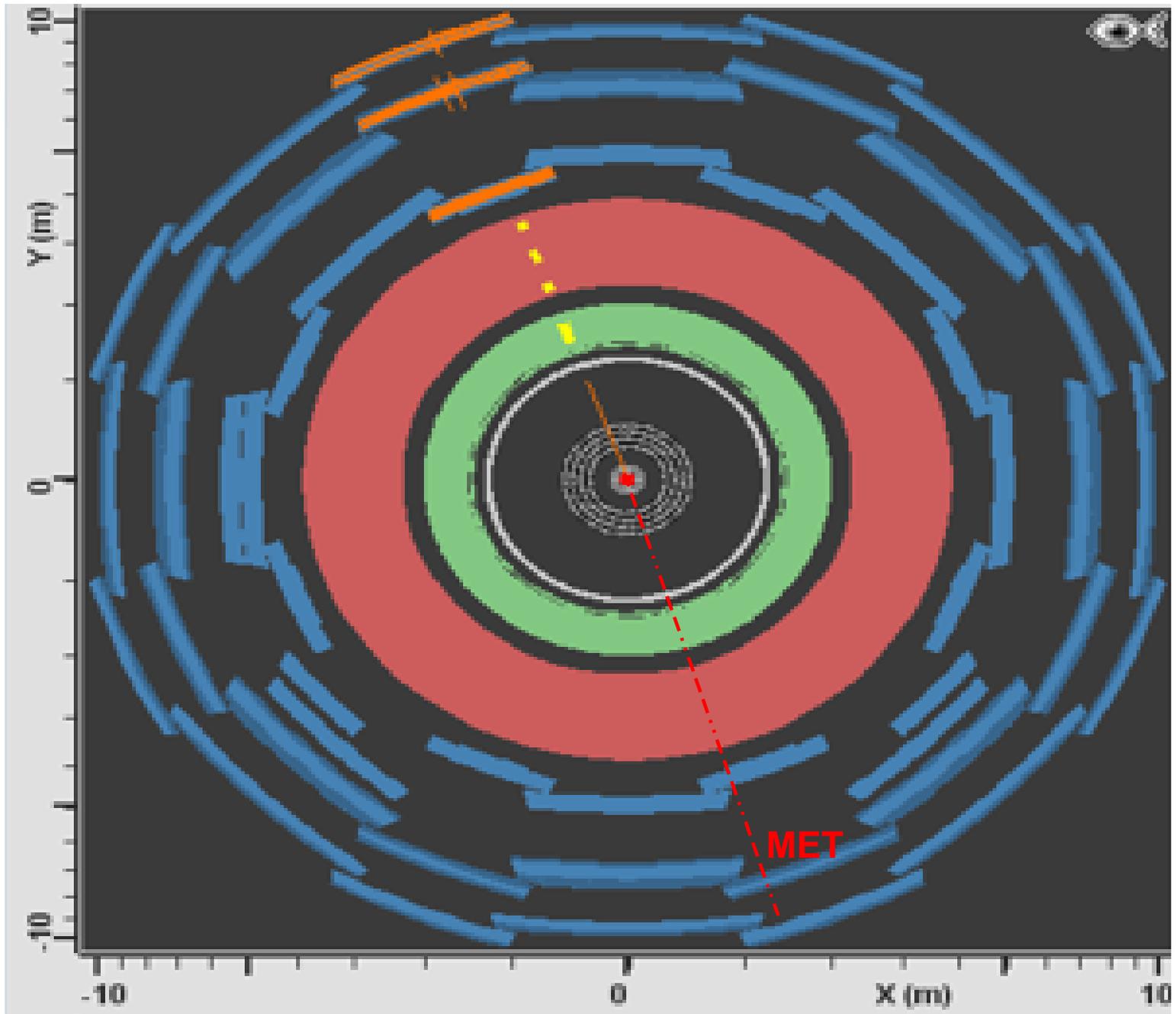
$$\vec{B} + \vec{C} + \vec{D} = -\vec{MET}$$

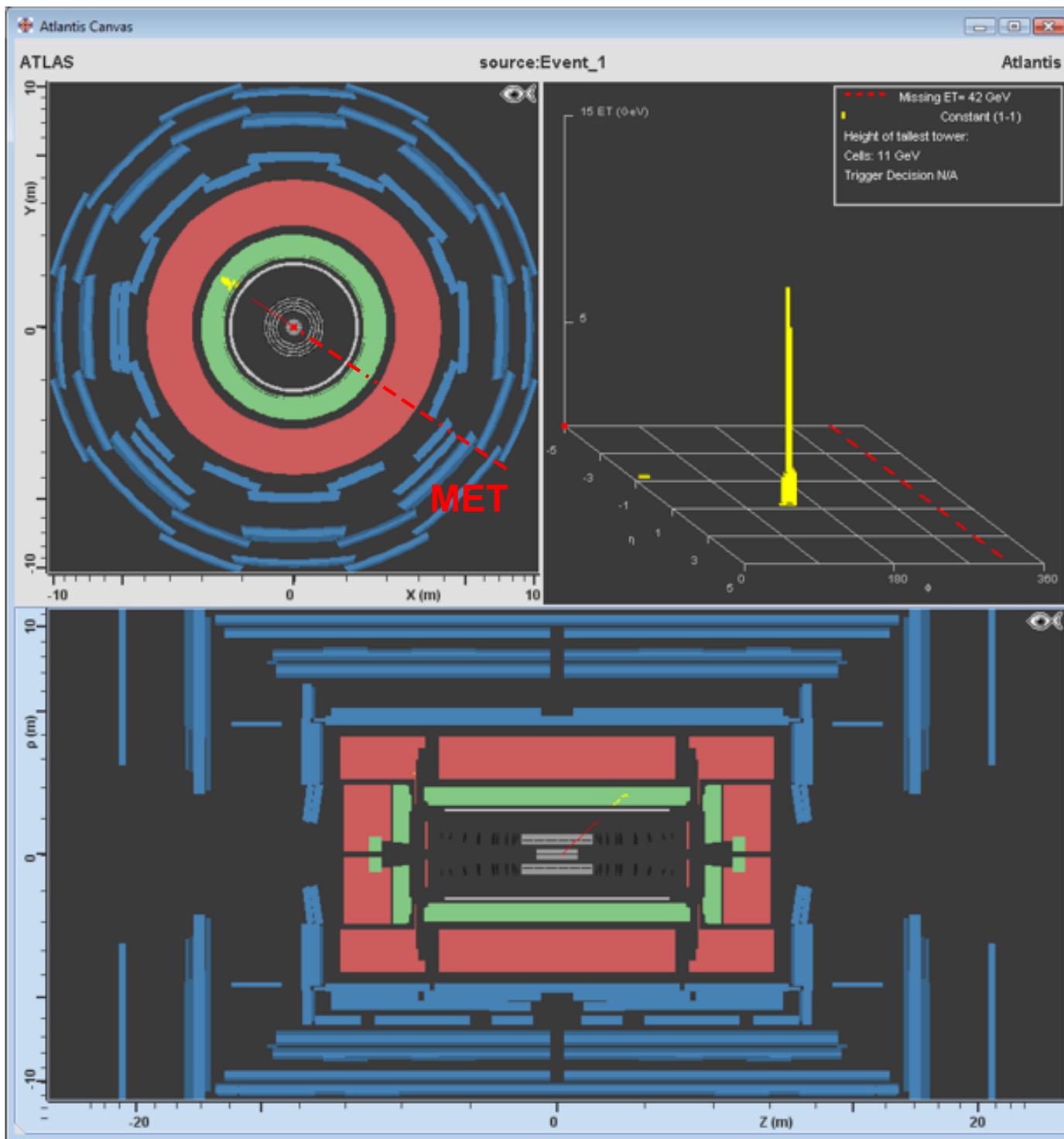
La non-conservation de l'impulsion dans le plan transverse au faisceau est une indication de la présence d'un neutrino

$$|\vec{MET}| \neq 0 \Rightarrow \text{Présence d'un neutrino}$$

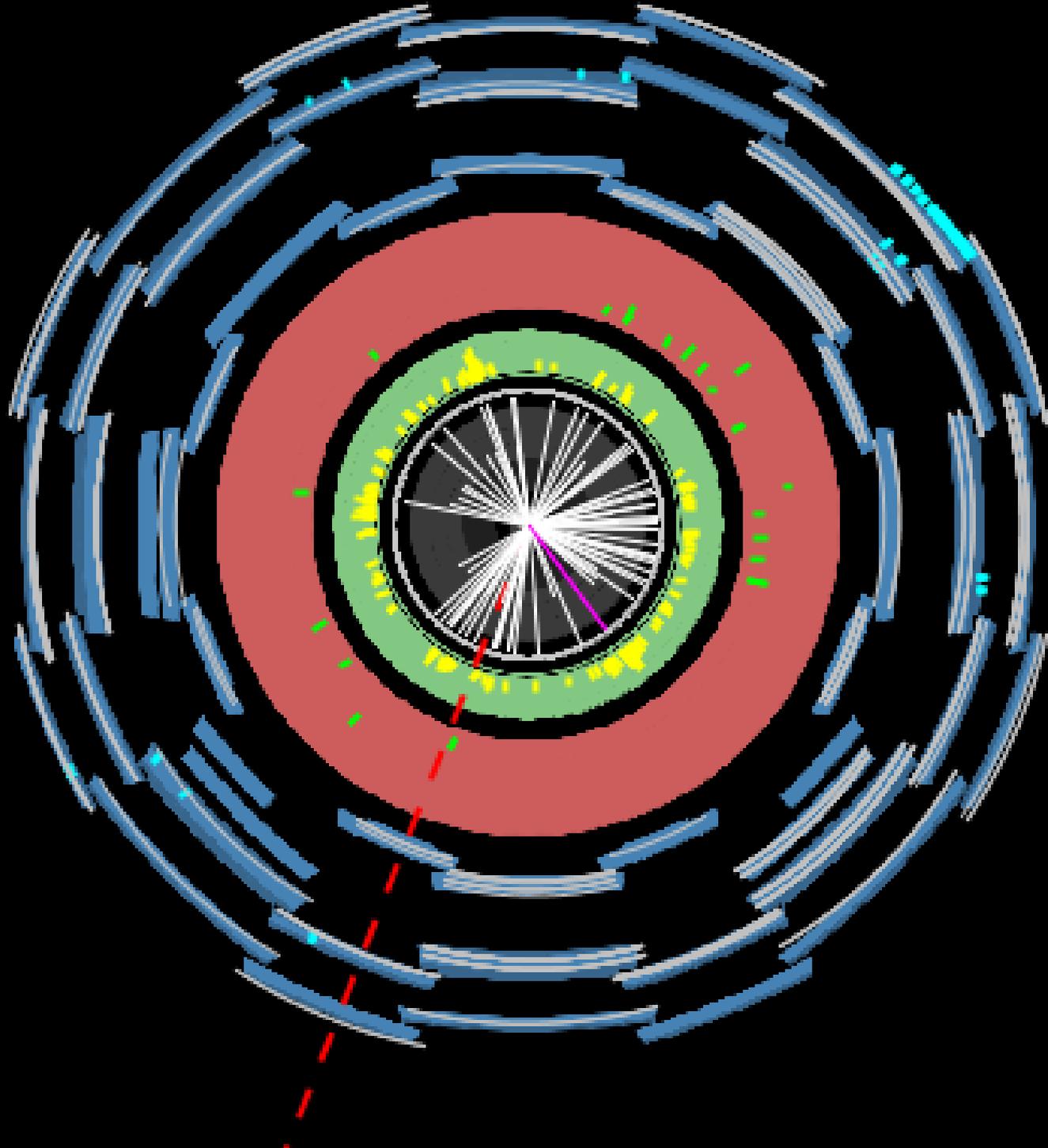




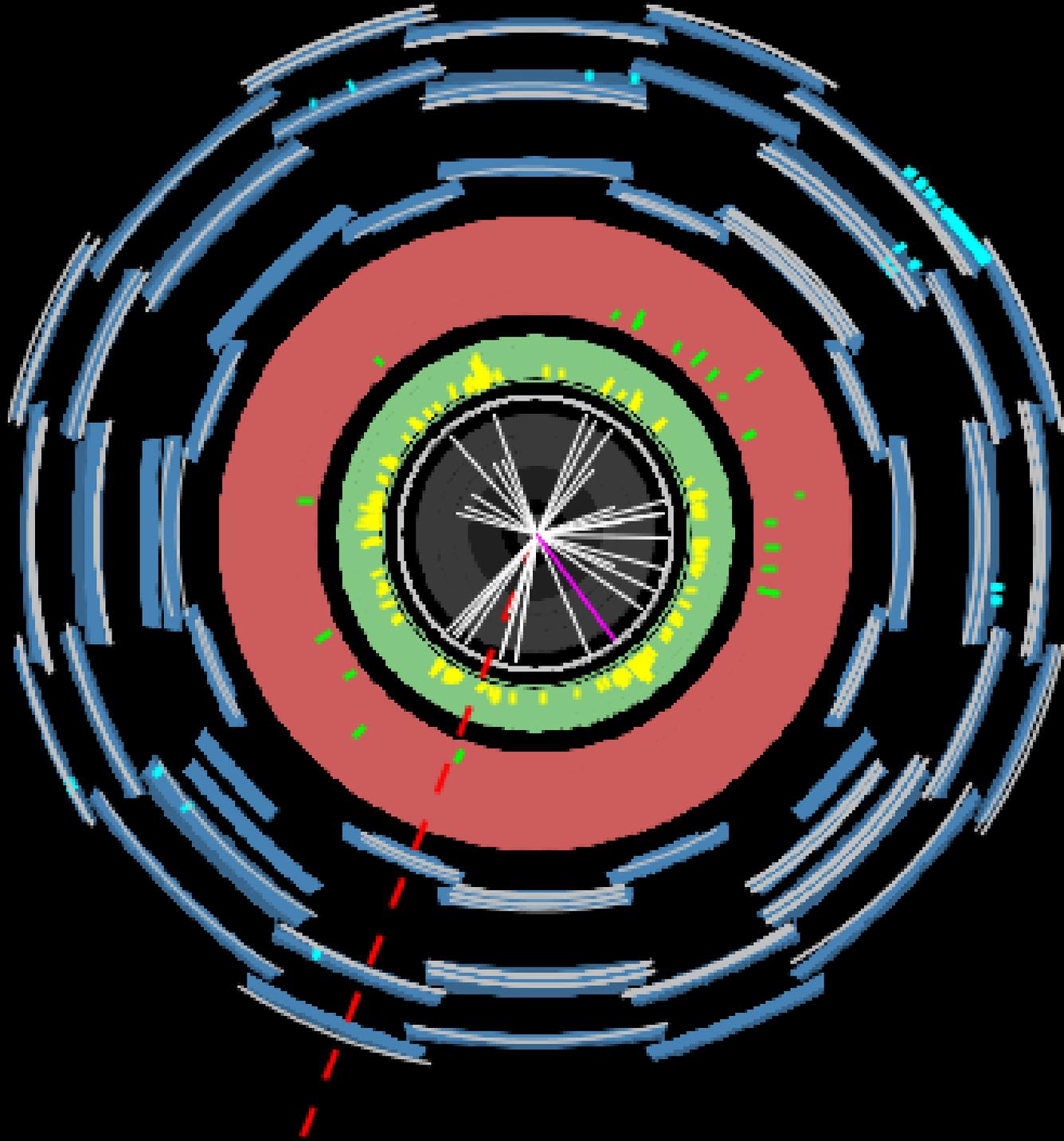




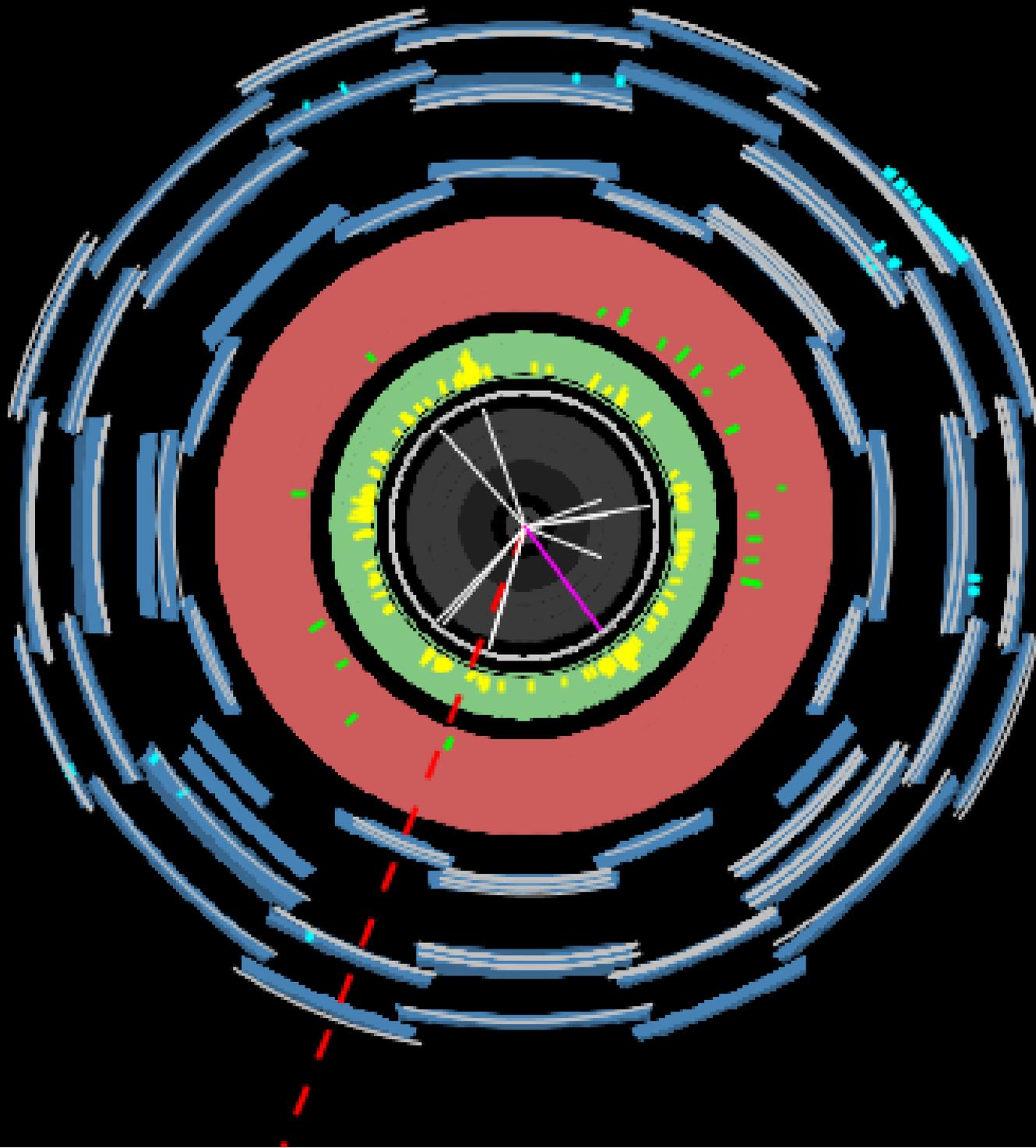
Pt>1GeV



Pt > 2 GeV



Pt>5GeV



Pt>10GeV

