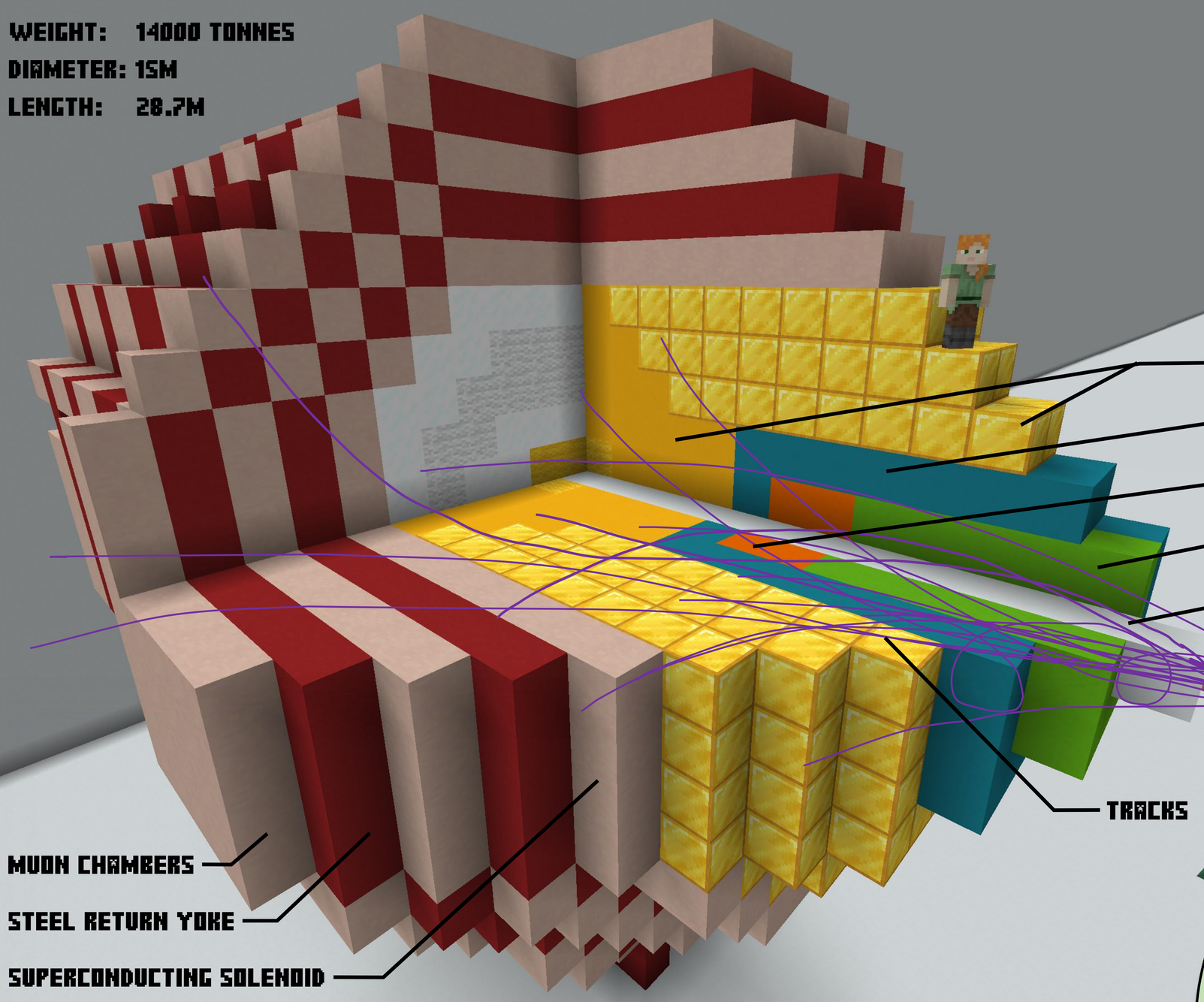
MINETRACKER

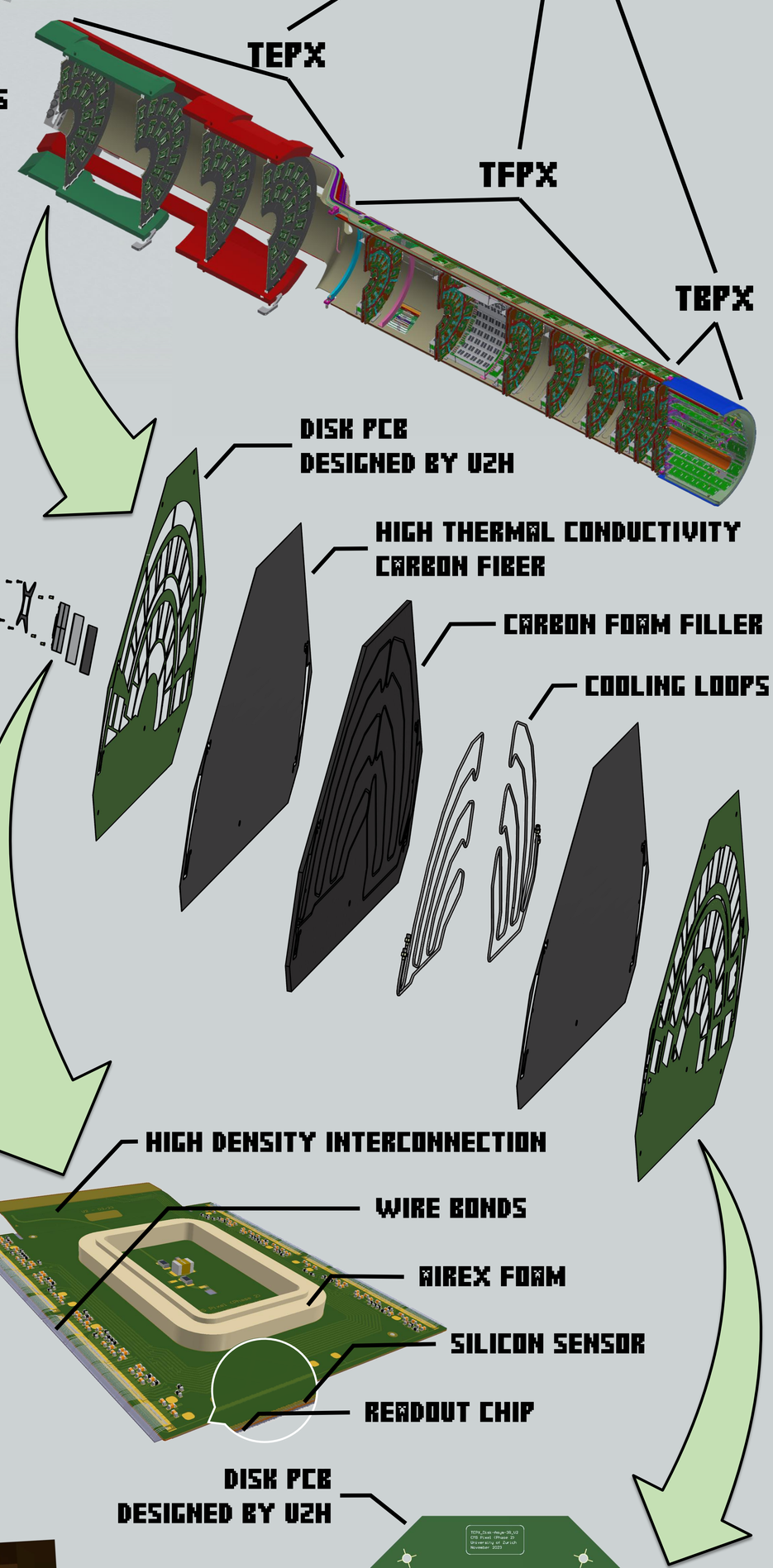
PROF. BEN KILMINSTER GROUP

WEIGHT: 14000 TONNES
DIAMETER: 15M
LENGTH: 28.7M



THE COMPACT MUON SOLENOID DETECTOR

CMS is one of the multipurpose detectors at the Large Hadron Collider (LHC), consisting of different subdetectors optimized for position and energy measurements of particles produced in collisions.



THE PHASE II UPGRADE

The upcoming High-Luminosity LHC (HL-LHC) upgrade is planning to increase its luminosity by a factor of ten, allowing the LHC to produce more data, enabling more precise measurements and the potential to observe rare processes not currently detectable. The CMS will also undergo significant upgrades to handle the increased data rates and harsher operational conditions expected in the HL-LHC era, continuing its role in pushing the frontiers of particle physics.

5 – 7.5x
compare to the average number of tracks the Phase-1 tracker designed for

10x
integrated luminosity over the 10 years compared to the LHC baseline program

Up to 200
additional pp collisions within the same or adjacent bunch crossing (pileup)

UZH group contributes significantly to the conception, development, construction, and calibration of the CMS Phase-2 inner tracker system, a high-end pixel system designed for HL-LHC's harsh pileup with improved tracking capabilities.

THE TEPX SUBDETECTOR – 3D TRACKER

GREAT PRECISION
25x100 μm² pixel size
Super camera with 2 Gigapixels

EXPANDED COVERAGE
4 layers + 24 disks. 5m² active Si area.
Azimuthal angle 2π, pseudorapidity $|\eta| \leq 4.0$

REDUCED NOISE
Less than 1%

RADIATION HARD
40 MHz pp collision, 3 GHz/cm² Hit rate

R&D FOR FUTURE 4D TRACKER

Build 4D sensors with novel Low Gain Avalanche Detectors (LGAD) technology, adding timing information to solve the tracking puzzle.