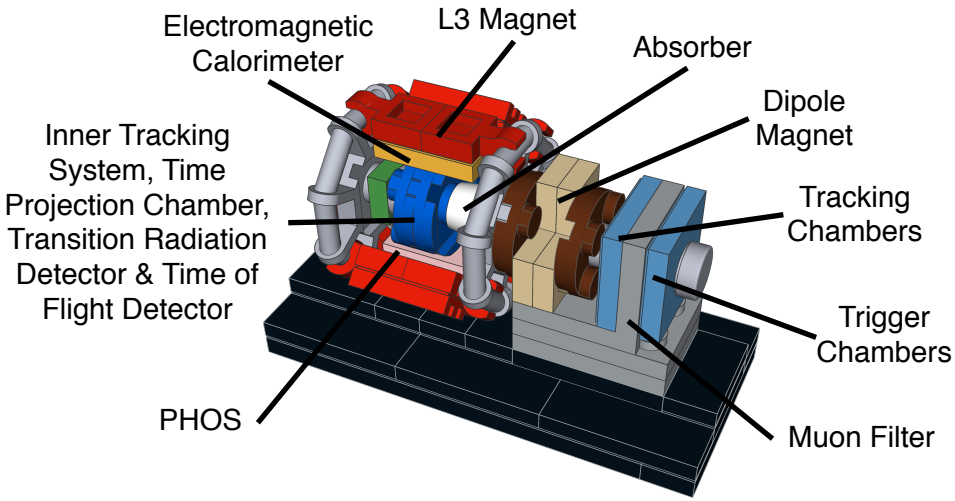
The ALICE Detector

Model Designed by Nathan Readioff



ALICE is a heavy-ion particle detector at the Large Hadron Collider (LHC) in CERN, which has been designed to investigate an exotic state of matter known as a quark-gluon plasma. The LHC spends a few weeks each year smashing lead nuclei together, causing their protons and neutrons to melt and recreating conditions that existed a fraction of a second after the Big Bang.

A powerful magnet system is used to bend the paths of all charged particles into curves, which helps physicists to accurately measure their properties. The inner tracker at the centre of ALICE contains six layers of silicon sensors to record the initial trajectories of charged particles. This is surrounded by the time projection chamber, which is a large gas-filled volume used to provide further particle tracking. The transition radiation detector is used to identify electrons and positrons, and is surrounded by a cylindrical “time of flight” detector that identifies charged particles by measuring their speed.

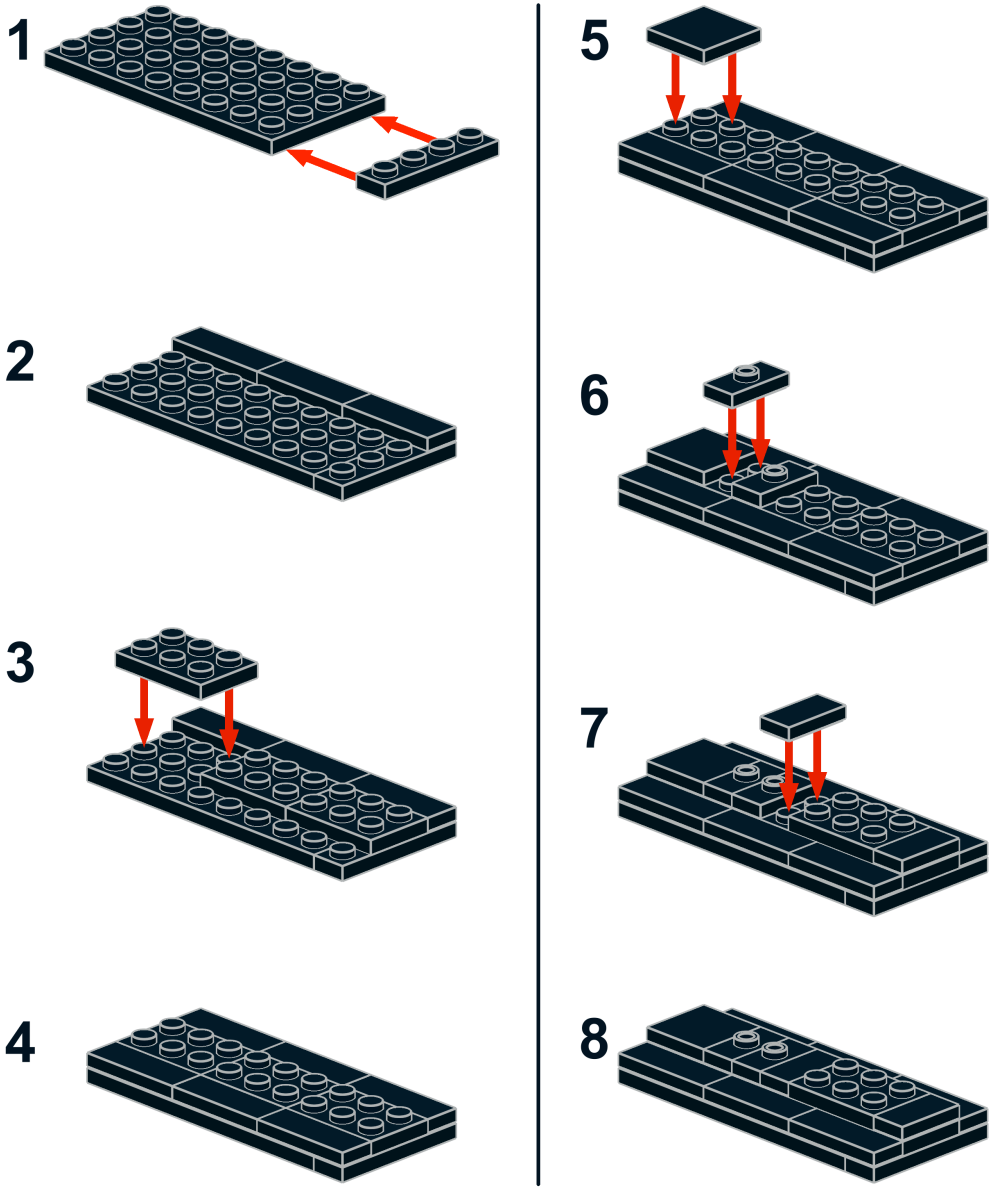
The electromagnetic calorimeter on the top of the inner tracking systems is built of alternating layers of lead and plastic scintillator to record the energy of various particles. The PHOS detector, a high resolution electromagnetic calorimeter made of lead tungstate crystals, is used to measure the temperature of the system.

The ALICE forward muon spectrometer studies the decay of heavy clusters of quarks, called quarkonia, into a heavy type of electron known as a muon. The absorber and muon filter block all particles except muons. A magnet separates out the muons before a series of tracking stations record their trajectories.

ALICE

UNIVERSITY OF LIVERPOOL

CERN



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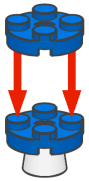

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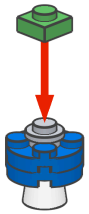

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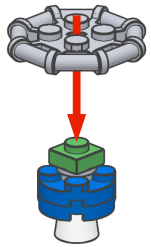

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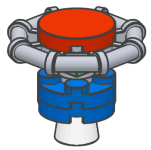

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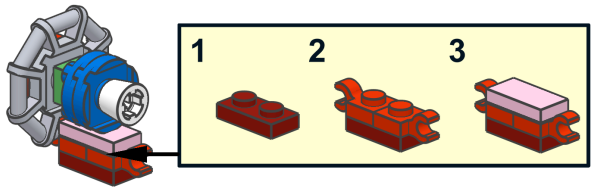

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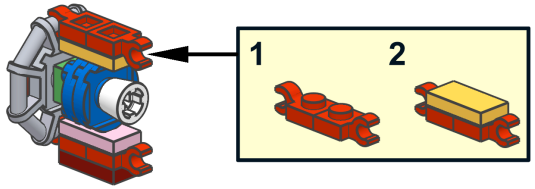

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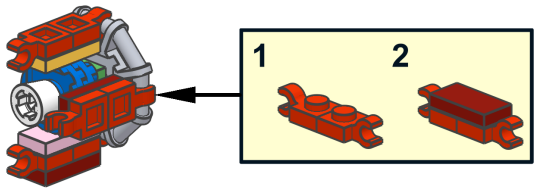

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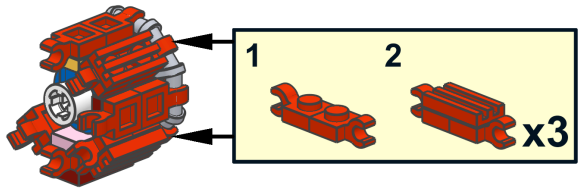

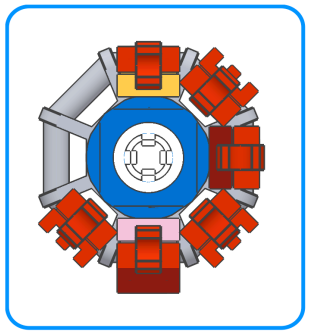

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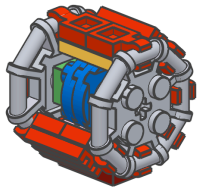

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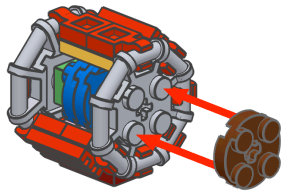

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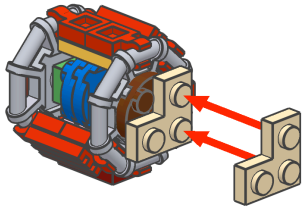

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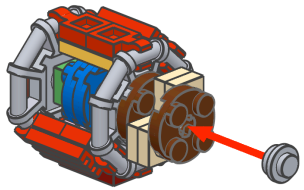

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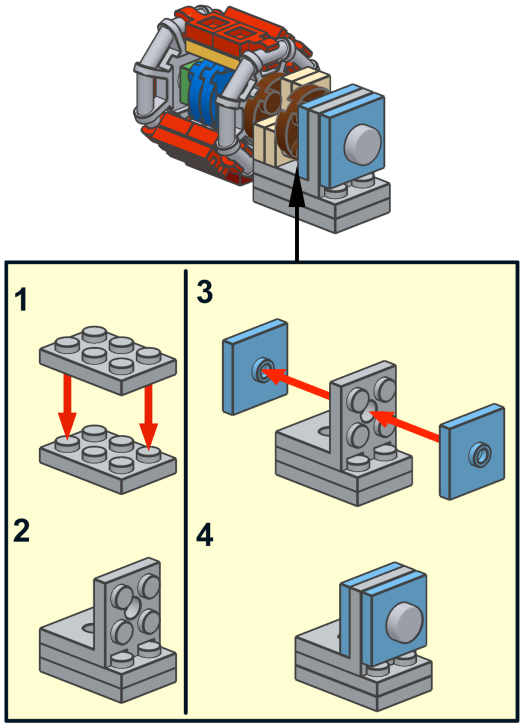

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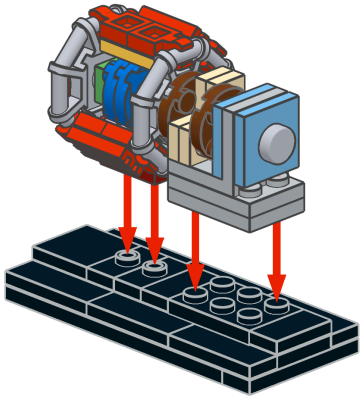

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