

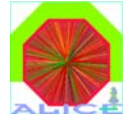
ALICE Status & Plans

- **ALICE Physics**
- **ALICE Detector**
- **Korean participation**





LHC Heavy Ion Program



● Physics : Study the state of matter in the early Universe

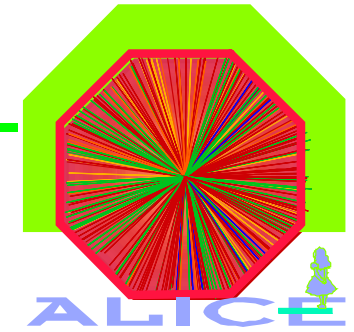
- ⇒ Collisions with heavy ions (Pb-Pb): 100 x energy of pp
 - ★ energy is distributed over nuclei => **Temperature** $\sim 10^{12}$ K (100,000 x T_{SUN})
 - ★ primordial state of matter, $\sim 10^{-6}$ s after the Big Bang: **Quark-Gluon Plasma**
- ⇒ interface between **High Energy Physics & Nuclear Physics**
 - ★ **HEP**: fundamental constituents & forces
 - ★ **NP**: large & complex many-body systems, emerging phenomena

● Detector(s)

- ⇒ one single **dedicated 'general purpose' HI expt** at LHC: **ALICE**
 - ★ **combines** $\sim 1/2$ of the worldwide heavy ion community (rest is at RHIC)
 - ★ specifically built & optimized for heavy ions (very large particle multiplicity)
- ⇒ **ATLAS/CMS** will participate, but **priority is pp** physics



ALICE Collaboration



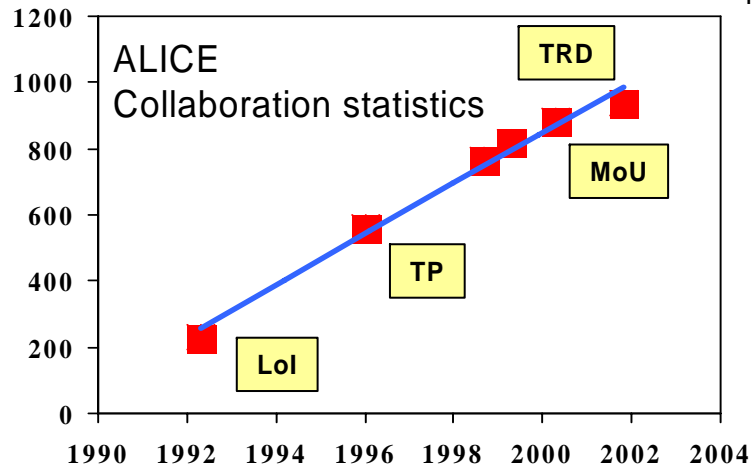
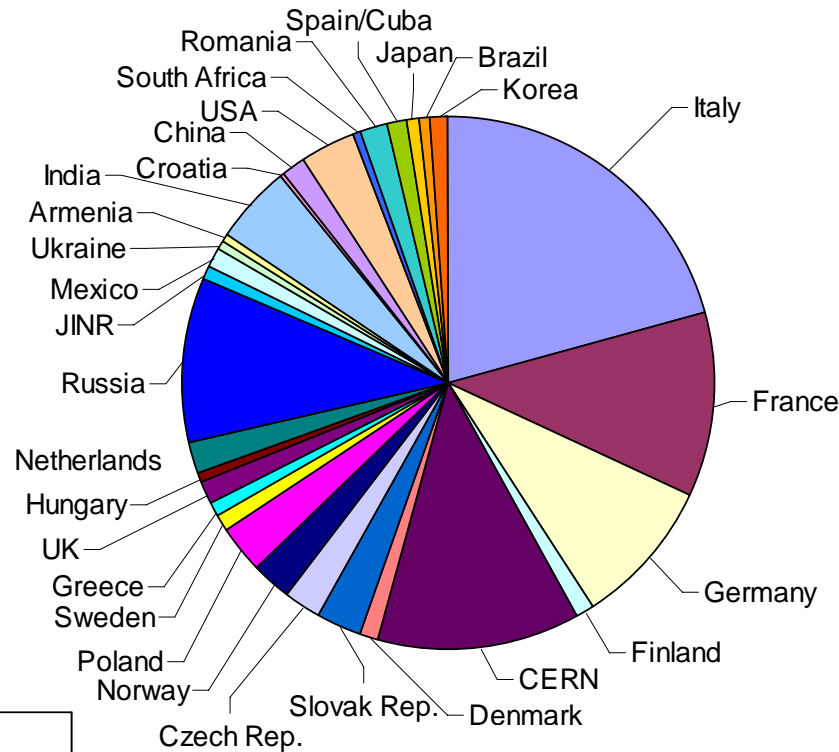
~ 1000 Members

(63% from CERN MS)

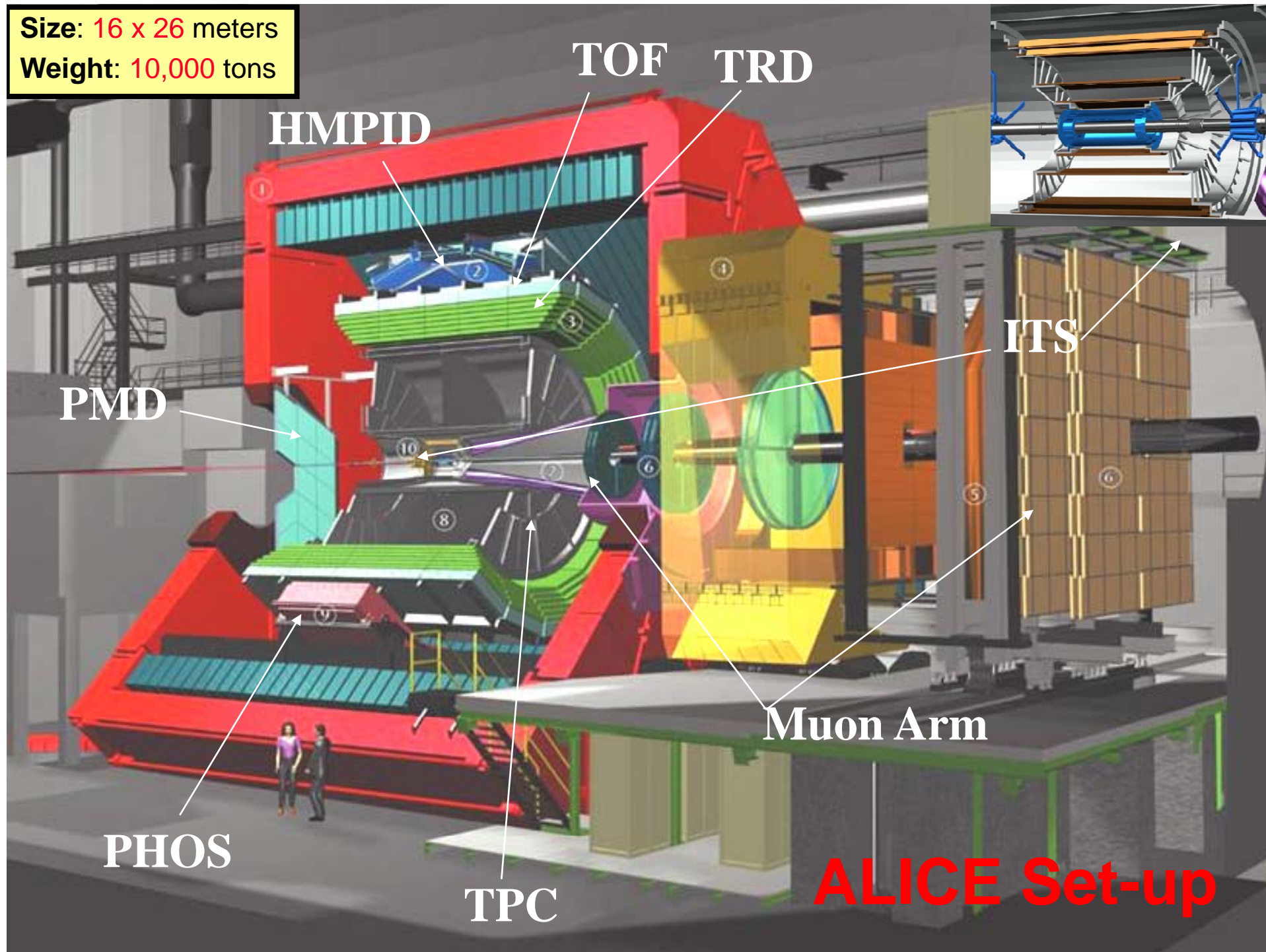
~30 Countries

~100 Institutes

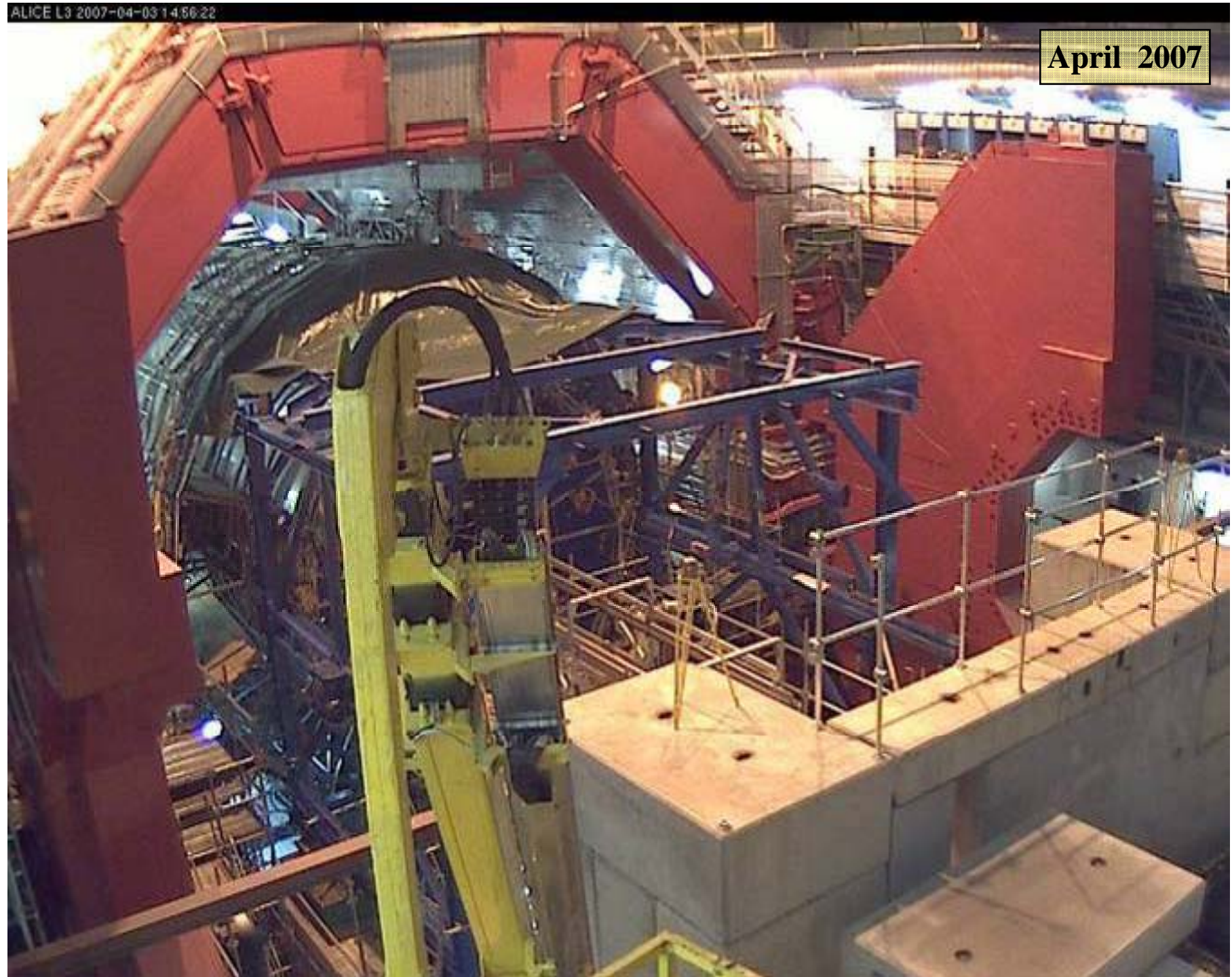
~ 150 MCHF capital cost
(+ 'free' magnet)



Size: 16 x 26 meters
Weight: 10,000 tons

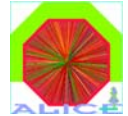


April 2007





Status & Plans



● Detector Construction & Installation

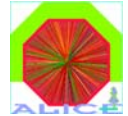
- ⇒ **baseline detector** essentially finished and being installed/commissioned
- ⇒ 2 detectors with late funding will be completed by 2010
 - ★ **TRD** (Germany + ...) by **2009**
 - ★ **PHOS** (Russia, Japan, Norway, + ..) by **2010**
- ⇒ **new detector**, currently under approval (ca 10 M\$)
 - ★ electromagnetic calorimeter **EMCAL** (US, France, Italy) by **2010/11**

● Long Term Plans

- ⇒ **baseline** heavy ion program ~ **10 years**
 - ★ modest detector **upgrades/improvements** possible around **2012**
 - ★ **R&D** and design to start after **2008**
- ⇒ long term options (> 2015) include luminosity and/or detector upgrades



Korean Participation



● Korean participation in Heavy Ion Physics

⇒ Korea has a number of **active** and **internationally recognized** groups in this field

★ CERN **SPS** fixed target (NA49, now finished): 1 group

★ USA **RHIC** (Star, Phenix): 7 groups

★ LHC **ALICE** : currently 2 groups

⇒ significant theory community

★ Andong, Pusan, Chonnam, Seijong, Kangnung, Yonsei, ...

● LHC provides a unified and long term perspective

⇒ **THE place** to do **frontline research** in about 1-2 years from now

⇒ ALICE has started a number of **initiatives & contacts** to **explore interest** in Korea

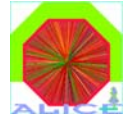
★ visits and workshops in 2000, 2004, 2006, 2007

★ regular meetings (HIM) and contacts between groups in Korea

⇒ goal: **broad, lively and coherent local community** involved with heavy ions @ LHC



Near Term Plans



- Gradually increase Korean participation in ALICE
 - ⇒ by a few strong, experienced & recognized groups in the coming years
 - ★ currently one group (Yonsei) has expressed strong interest to join ALICE
 - ⇒ centered around **physics analysis**
 - ★ participation in **GRID computing** infrastructure
 - ★ new hardware limited to participation in detector commissioning & operation
- Financial implications
 - ⇒ no new construction responsibilities are envisaged
 - ★ some increase in GRID computing capacity in Korea could be discussed
 - ⇒ one-time 50 kCHF contribution to the Common Fund per new Institute
 - ⇒ operation expenses
 - ★ M&O A (~13 KCHF/year per PhD)
 - ★ group operation (travel, students,)
- Procedure
 - ⇒ ALICE would like to **discuss** with and **get advice** from **Korean Funding Agency**
 - ★ **if** such a gradual increase in Korean participation may be supported
 - ★ **how** and **on which time scale** this could be implemented