

# Particle Physics

Global collaboration to study the physics of strongly interacting matter

## TEIN network enables Thai researchers to participate in Large Hadron Collider experiments

One of CERN's aims with the Large Hadron Collider (LHC) is to help the global particle (high-energy) physics community better understand the fundamental laws of nature. As part of this researchers from around the world are heavily involved in LHC experiments, with this global community including Thai particle physics researchers at Suranaree University of Technology (SUT) in Nakhon Ratchasima. They are participating actively in LHC experiments through the high-speed research network of TEIN, sharing their resources and working seamlessly across borders.

### Enabling global particle physics research

One of the key LHC experiments is ALICE (A Large Ion Collider Experiment), a heavy-ion detector that is dedicated to studying the physics of strongly interacting matter, called quark-gluon plasma, at extreme energy densities.

Thailand is a full member of the ALICE collaboration with researchers actively involved in the Inner Tracking System (ITS) upgrade project for ALICE. The main goal of ITS is to improve the detection efficiency of ALICE, enabling it to cover currently inaccessible low transverse momentum particles, and thus gain sufficient measurements to properly study their behavior. ITS is scheduled to be completed before the next Large Hadron Collider Run 3 in the year 2020.

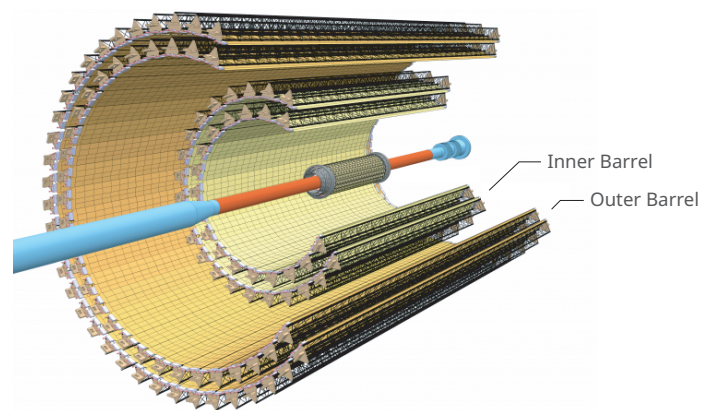
SUT is one of the five founding members of the National e-Science infrastructure consortium of Thailand. As well as its work on ITS, the consortium's mission was to set up an ALICE Tier 2 center at SUT. This is connected to other Thai research institutes through the Inter-University Network (UniNet) and Thailand Research and Education Network (ThaiREN).

"Our strategy was to form a consortium of research institutes in Thailand working together to address different aspects of the project," said Dr. Chinorat Kobdaj, Experimental Particle Physics

Group, Center of Excellence in High Energy and Astrophysics, Suranaree University of Technology. "While we have excellent support and dedicated bandwidth within Thailand, we required similar high-speed, high-capacity links to collaborate with colleagues at CERN and across Asia."

To achieve this international collaboration, the researchers rely on Asi@Connect, which provides the Trans-Eurasia Information Network (TEIN), a dedicated regional high capacity and high quality internet network for research and education, and also leverages the e-infrastructure developed for public sector projects. The successor project to TEIN4, Asi@Connect now connects Asian researchers to each other and with their counterparts in Europe via direct links to the pan-European GÉANT network.

Thanks to the TEIN network, researchers will be able to work with colleagues at CERN, and with the ALICE Tier 1 center at the Global Science Experimental Data Hub Center (GSDC) at the Korea Institute of Science and Technology Information (KISTI).



The new Inner Tracking System (ITS) for ALICE

## Callouts(sub-information)



WLCG signing ceremony between CERN and consortium of Thai institutes on 10 Oct 2013



The map shows the responsibilities divided among Thai institutes

### The Challenge

While the ThaiREN and UniNet networks connect institutes at high speed within the country, the consortium knew that accessing sufficient international bandwidth and capacity was vital to the success of the collaboration, particularly as the upcoming Large Hadron Collider Open Network Environment (LHCONE), has stringent requirements in terms of network bandwidth.

### The Solution

the TEIN network enables the researchers both to link to Europe, and to the ALICE Tier 1 center in Korea, providing sufficient bandwidth for Thai physicists to analyze ALICE data and share their

findings with colleagues in Asia-Pacific and worldwide.

### Key Benefits

Thanks to TEIN, collaboration and analysis will be dramatically faster. The project also has wider benefits. It is enabling local students and researchers to work with their peers in the international scientific community, increasing technology transfer and building capacity, while stimulating greater public interest in related fields, such as proton therapy cancer treatment.

### Trans-Eurasia Information Network

TEIN is the regional research and education (R&E) network connecting scientists and researchers across the Asia-Pacific region and globally. Co-funded by the EU and Asian partners, and managed by TEIN\*CC, the network began operating in 2000 and now is available through the Asi@Connect project.

## Quotes

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Using TEIN enables Thai physicists to collaborate closely with colleagues in Europe and the rest of Asia, helping them become actively involved in LHC experiments that are improving our understanding of the fundamental laws of physics.

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Involvement in this project is driving greater interest in physics within Thailand and is inspiring young and talented students by enabling them to interact with their peers in the global community.

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### For more information

Asi@Connect : [www.tein.asia](http://www.tein.asia) GEANT : [www.geant.net](http://www.geant.net) UNINET : [www.uni.net.th](http://www.uni.net.th) ThaiREN : [www.thairen.net.th](http://www.thairen.net.th) SUT : [www.sut.ac.th](http://www.sut.ac.th)

### Disclaimer

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