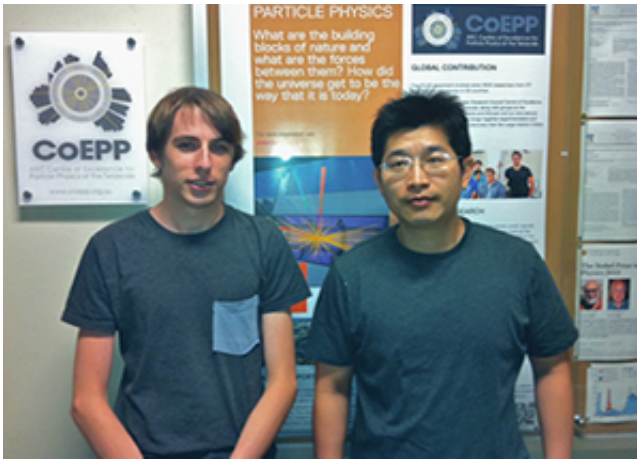


The short but eventful life of a Higgs boson particle

May 28 2014, by Pristine Ong



Physicist Geng-yuan Jeng and PhD student Curtis Black

Recent results from the ATLAS experiment at CERN have given a clearer picture of the short but eventful life of a Higgs boson particle.

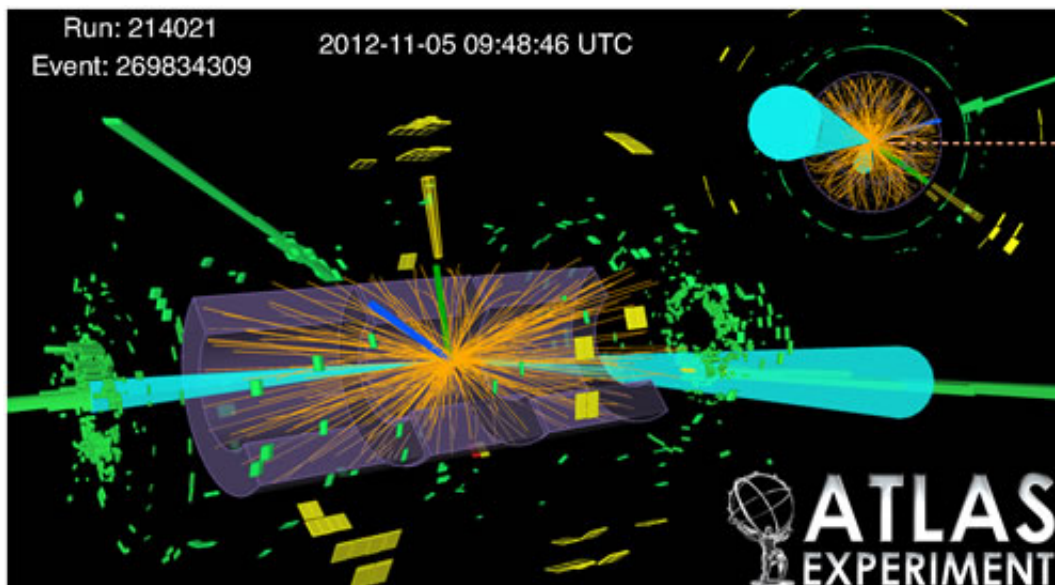
Evidence from the experiment indicates that the Higgs boson decays to a pair of taus, part of a group of [subatomic particles](#) called fermions that make up matter in the universe. For particle physicists around the world, the results are an exciting pay-off in their collaborative efforts to discover the origin of particles.

Geng-yuan Jeng, a physicist at the University of Sydney, has been an integral part of the CERN team, working on the complex analysis codes

used in the Higgs search. The 35-year-old post-doctoral fellow is a member of an international team of researchers at the Sydney University Particle Physics Group.

"The ATLAS experiment is a masterpiece of modern technology that allows us to search for ephemeral phenomena of extremely small particles - such as the Higgs boson which decays really quickly," he says. "We do this by picking up clues left in various sub-detectors in order to reconstruct the origin of particles."

Physics is all about precision, and for the project to achieve accurate results requires a team effort by many people. Dr Jeng is part of the ATLAS collaboration's Higgs hunting group which focuses on di-tau decay modes. As part of the Sydney node of the ARC Centre of Excellence for Particle Physics at the Terascale (CoEPP), he works in close collaboration with colleagues at the University of Melbourne as well as Mark Scarcella and Curtis Black, both PhD students at the University of Sydney.



Event display from the ATLAS experiment

He spent more than two years in Europe with CERN, but is now happy to work from Sydney and form a bridge between one of the world's major global projects and Australia's scientific community.

Originally from Taiwan, Geng-yuan Jeng studied in California before coming to Sydney in 2011. He says: "When I came to Australia, the country showed great interest in developing this area. I realised that making everything work at CERN requires collaboration and I jumped at the opportunity to work as part of a growing team led by Associate Professor Kevin Varvell, to lead the search and be the first to do something new."

Dr Jeng says the ATLAS project has brought many physicists together who would otherwise have worked independently. "In experimental [particle physics](#), we require people with different skills - not just physicists, but also engineers and technicians."

After recent results from the ATLAS experiment, the future holds interesting possibilities for fermionic study of the properties of the Higgs boson. Dr Jeng says: "We are expecting much more data when the LHC restarts in 2015. It will allow us to improve analysis techniques to increase the sensitivity of our searches and boost our evidence. At the same time, a big increase in data does not guarantee a free pass for discovery because we have no formulae to determine how well we can exploit such information. It's simply a step towards gaining certainty in our research."

Provided by University of Sydney

Citation: The short but eventful life of a Higgs boson particle (2014, May 28) retrieved 20 March

2024 from <https://phys.org/news/2014-05-short-eventful-life-higgs-boson.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.