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Canadian Particle Physics Team Announces World Record Search

The ATLAS Collaboration, a team of 3,000 scientists from 38 countries, announced world records in the search for new particles created in high-energy proton-proton collisions at the CERN Large Hadron Collider. The results from the first LHC data, shown this week at the International Conference on High Energy Physics in Paris, France, provide the most sensitive probe ever performed for new forms of matter. Canadian researchers played a central role in these searches setting new limits on the mass of such new particles, with a sensitivity superior to that achieved by another research team working at the LHC and two research teams working at the Fermilab proton-antiproton collider.

Dr. Pierre Savard, a Professor at the University of Toronto and TRIUMF scientist who is one of the two conveners of the Exotics physics group of the ATLAS collaboration, said of this result: "This is an important milestone for ATLAS and the LHC. It signals that we are now exploring uncharted territory at the high energy frontier".

The Canadian research team examined over 200 million proton-proton collisions, looking for collisions that produced particles hundreds of times heavier than ordinary matter. Various theories predict such objects, known as "excited quarks", and if observed they would revolutionize our understanding of matter and the forces that cause particles to bind together, or interact in other ways. Finding no evidence of such particles, the team was able to exclude their existence below a mass of 1,290 GeV/c^2 at 95% confidence level.[1]

The analysis of the huge data sample was only made possible with the large computing resources Canadian scientists had available through Compute Canada, in particular at SciNet and WestGrid, as well as at the dedicated ATLAS Data Centre at the TRIUMF laboratory in Vancouver, B.C. Dr. Robert McPherson, the spokesperson for the Canadian ATLAS collaboration and a research scientist at the Institute of Particle Physics, said "This important result was made possible only through a focused effort on the part of the Canadian scientists, with graduate students, postdoctoral fellows and university faculty working closely to be able to push the envelope so far so quickly".

Funded by grants from the Natural Sciences and Engineering Research Council and the Canada Foundation for Innovation, the ATLAS Canada research team is now working with their collaborators to collect more data as the LHC continues to ramp up in the rate of collisions.

For more information about Canadian involvement in the LHC and ATLAS, see http://www.atlas-canada.ca/

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[1] An exclusion limit at 95% confidence level is a statistical statement that quantifies how likely the researchers are correct in the limit they set. The study would come to a similar conclusion 19 times out of 20 if new particles with masses below the limit didn't exist.

About ATLAS Canada

ATLAS-Canada comprises about 150 faculty members, post-doctoral fellows and students from eleven Canadian institutes: the University of Alberta, University of British Columbia, Carleton University, McGill University, Université de Montréal, University of Regina, Simon Fraser University, University of Toronto, TRIUMF, University of Victoria and York University. ATLAS Canada and the Canadian Tier-1 Data Centre are supported in part by NSERC, CFI, CANARIE, and the BC Knowledge Development Fund. See http://www.atlas-canada.ca/.

About ATLAS

ATLAS is a worldwide collaboration comprising about 3000 scientists and engineers from 178 institutions in 35 countries and regions. These are Armenia, Australia, Austria, Azerbaijan, Belarus, Brazil, Canada, China, Czech Republic, Denmark, France, Georgia, Germany, Greece, Hungary, Israel, Italy, Japan, Morocco, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Taiwan, Turkey, United Kingdom and the United States of America.

About the Large Hadron Collider

The Large Hadron Collider or LHC is a particle accelerator which, at 27 kilometres in circumference, will be the world's largest and most complex scientific instrument when it switches on in fall 2008. The LHC is the world's most powerful particle accelerator, producing beams seven times more energetic than any previous machine, and around 30 times more intense when it reaches design performance, probably by 2010. It relies on technologies that would not have been possible 30 years ago. The LHC is, in a sense, its own prototype.

About CERN

CERN, the European Organization for Nuclear Research, is the world's leading laboratory for particle physics. It has its headquarters in Geneva. At present, its Member States are Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom. India, Israel, Japan, the Russian Federation, the United States of America, Turkey, the European Commission and UNESCO have Observer status. Canada has made important contributions to CERN's flagship accelerator, the Large Hadron Collider and one of its associated particle physics detectors, the ATLAS experiment. See http://cern.ch and http://lhc-first-beam.web.cern.ch/.

About TRIUMF

TRIUMF is Canada's national laboratory for particle and nuclear physics. Located on the south campus of the University of British Columbia, TRIUMF is owned and operated as a joint venture by a consortium of the following Canadian universities, via a contribution through the National Research Council Canada: University of Alberta, University of British Columbia, University of Calgary, Carleton University, University of Guelph, University of Manitoba, McMaster University, Université de Montréal, Queen's University, University of Regina, Simon Fraser University, Saint Mary's University, University of Toronto, University of Victoria, York University.

About the Institute of Particle Physics

The IPP is a not-for-profit corporation operated by fourteen member institutions: University of Alberta, University of British Columbia, Carleton University, McMaster University, Université de Montréal, Perimeter Institute, Queen's University, University of Regina, Simon Fraser University, University of Toronto, TRIUMF, University of Victoria, Western University, York University. Supported by NSERC, we have a contingent of eight senior research scientists affiliated with member universities, with the goal of maximizing the impact of Canadian contributions to major international particle physics projects such as the ATLAS experiment. For more details see http://www.ipp.ca.

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