



ATLAS e-News

23 February 2011

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Editorial



From Fabiola Gianotti and Peter Jenni

2011: Let's go!



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"One never knows where falling in love might lead you to!" says **Pauline Gagnon**

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Editorial: Thank-you Pauline, mission accomplished!

23 February 2011



With this issue of the e-News, a chapter of ATLAS history comes to an end. It is a small chapter, but one which has grown dear to our daily life in the experiment.

The e-News in their present form have accompanied us through the construction, installation and commissioning of the detector to the exciting times now of first physics at the LHC. Not only technically, but also humanly, the e-News witnessed these last years of the dream becoming a reality. One colleague has shaped and steered as main editor these lively bi-weekly accounts since almost five years: Pauline Gagnon.

The Collaboration owes Pauline a big and warm 'thank you' for her great job in motivating people to share their excitement, work and challenges with the Collaboration in an accessible way for all. It became quickly visible when she took on the editorial task in May 2006 that her ambitious goal was to change the e-News into a frequent and regular journal, keeping up the pace with the fast changes happening in the experiment's life. Everybody in ATLAS should feel part and proud of the stunning progress achieved by the Collaboration on all fronts. The e-News should allow people from outside ATLAS to also feel the excitement and get the 'pulse of the actions' of an unprecedented experiment coming into operation. The result of her efforts can be summarized with a straightforward and wholehearted: 'Mission Accomplished'!

Pauline has accomplished her task with a dynamic editorial team, having had the pleasure to work with several talented young journalists. Many thanks are also due to them, of course, and in particular to the present editorial team: Birgit Ewert and Ceri Perkins. After Pauline's departure in December, and with Ceri moving on to other projects this month too, the e-News as we know it will go through a phase change that will be shaped in the coming weeks. And Pauline will be off for new challenges: her dedication to communicate science to the broader community and the public will continue in the coming year with the CERN Communication Group, besides of course enjoying ATLAS physics analyses. We wish her all the best!

Fabiola Gianotti and
Peter Jenni





2011: Let's go!

23 February 2011



The LHC's annual Chamonix meeting took place at the end of last month and, aside from the concerning lack of fresh fluffy snow, there were some very serious points up for discussion. In the wake of the meeting, we now know: The LHC will postpone its long refurbishment shutdown for an extra year, until 2013; and, for 2011 at least, the beam energy will stay fixed at 3.5 TeV.

Each of the experiments presented their case for whether or not the machine should increase to beam energies up to 4 TeV for the coming year. ATLAS's Bill Murray reported that all the LHC experiments were in favour of this, on the condition that it would not compromise the machine. ATLAS and CMS studies show, he said, that running at 4 TeV would offer a gain equivalent to 20 per cent more Higgs candidates in a search for a Higgs with a mass of around 120 GeV and almost 100 per cent more signal events for certain exotic searches and SUSY particles.

Whilst upping the energy was judged positive for the physics programmes of the experiments, there were a number of in-depth presentations from the machine side, which gave everyone a pause. Detailed simulations of different quench scenarios concluded that if the machine runs with beam energies of 4 TeV, the chance of a burnout similar to that of 2008 is something of the order of 0.5 per cent.

That seems pretty small but, as ATLAS's Herman ten Kate summed up well, not if you consider the risk being proposed: You would not, he pointed out, board a plane if you were forewarned that there was a half a per cent chance that the plane would crash. It's just not a chance worth taking. CERN, the experiments and the machine were agreed, then – next year the LHC will run at 3.5 TeV.

"I don't feel this is an important limitation," considers ATLAS Physics Coordinator, Aleandro Nisati. Although higher energy beams would extend the range of masses that could be explored for new physics, precious data-taking time could be lost to the new energy set-up phase, and could result in less data collected by the end of the year. "I think that the physics potential of a 7 TeV machine delivering high integrated luminosity is really very important. And I don't think that we are paying that much by not going to 8 TeV."

The second big decision – whether to run in 2012 – followed on neatly from the first. With five inverse femtobarns of data, the whole mass spectrum where the Higgs is expected to lie could be searched for statistical 'evidence' – the first hints – of the

particle. The Tevatron's move not to run beyond 2011 puts them out of the running for an outright Higgs discovery, but CERN is well aware that they could still be in a position to claim 'evidence' of it before the year is out.

"It's clear that the race with Fermilab is not yet finished," says ATLAS Deputy Run Coordinator Martin Aleksa. In light of the Tevatron's decision to shut up shop, the argument for the LHC to run in 2012 is no longer based on competition for a full-blown Higgs discovery. Nevertheless, says Martin: "It became clear that five to ten inverse femtobarns is something we'd really ought to get before we go to a long shutdown, because we have seen that this amount of data will give us significant new insights." As a conservative estimate, the LHC folks are projecting an integrated luminosity of one inverse femtobarn for the next year, although if things progress well this could rise to two, three, or maybe even four, at a stretch. For the magic five though, running in 2012 was deemed necessary. "To be sure that LHC can really say something about the Higgs before the long shutdown, I think we need these two years," says Martin.

"The prospect of having certainly one inverse femtobarn of integrated luminosity by the end of this year, and significantly more by the end of next year, is extremely attractive and important," says Aleandro. "Other than the Higgs, we have a very rich plan of physics studies, in particular searches for new physics ... SUSY, new heavy bosons, leptiquarks. The most sensitive channels will be permanently under observation; we'll be continuously watching the data to see if something new, funny, or interesting appears. But we'll also continue to explore the new data as much as we can at 360°."

Beams are due back in the machine before the start of March, and a swift ramp-up should see the machine filled with a record 936 bunches and peak instantaneous luminosities of the order of 10^{33} by mid-May. "If we then run for the 130 days which are now foreseen for proton physics, we could collect something like three inverse femtobarns of data this year," says Martin. During the ramp-up, a final decision will be taken on the bunch spacing – beginning with them at 75 nanosecond intervals, but possibly progressing to 50 nanosecond bunch spacing, meaning a total of 1404 bunches in the machine by the end of the intensity ramp. The beams will also be more focussed within the experiments this year, due to more intense squeezing.

"ATLAS is built for much higher peak luminosities than we expect for the coming year. However, every experiment needs a certain ramp-up phase where we're learning," says Martin. "If we really go to 10^{33} in the next few months, this is a rather quick ramp-up and we'd better anticipate anything that can come up."

The looming problem of pile-up – with up to 15 proton interactions per bunch crossing (of which there will be around a million per second), compared to last year's average of four – as well as the question of which objects to trigger on at higher luminosities, has been occupying the Trigger group for months now. They have been working on the new Trigger Menu pre-emptively since last October. "Of course, it was in good hands, and this work is almost finished," says Martin.

There is also an ongoing effort to maximise the recording rate – how many events per second can actually be written to disk. At luminosities of 10^{33} , ATLAS's baseline recording rate of 200 Hertz would already mean giving up some good events. To avoid compromising physics, the plan is to optimise the amount of different data types stored on disk, so that a larger number of events can be stored for offline studies.

Over in the Control Room, things will soon be looking lively too. All the subsystems migrated to the new TDAQ software version over the winter break and, kinks now ironed out, they've just begun running together in combined mode to make sure everything is ready for first collisions in mid-March.

The Control Room will gradually start filling up again over the next couple of weeks, although it won't get quite as busy as last year; ATLAS will start off with 13 shifters, down from last year's 16, and this can hopefully be further reduced as more is learned about the detector and more processes can become automatic. The newly-free desks will be reserved for experts, so there is always a spot for them in the room if they need to check on something. "Reducing is a slow process, I saw it myself," laughs Martin.

Martin will take over from Benedetto Gorini as Run Coordinator at the end of the month, and Thilo Pauly will come in as his new Deputy. For now, Martin is all smiles about the exciting year ahead: "Expectations are high, because last year we had 93.6 per cent efficiency" he says. "Let's see..."

Ceri Perkins
ATLAS e-News



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ATLAS in the podosphere

23 February 2011



The Guardian's Andy Duckworth recording on location at ATLAS

“Most programs would normally do their Christmas special from somewhere like Lapland. We’re different though,” says The Guardian newspaper’s Andy Duckworth, introducing the seasonal special of their *Science Weekly* podcast: *Christmas at the Large Hadron Collider*.

Science Weekly is a lively 30-ish minute podcast that covers topical issues, philosophical questions, and new developments in science. It has quite a following, and was named Best Podcast in the Physics.org Web Awards. The LHC and the physics it will explore is a favourite topic on the show, and this Christmas, ATLAS and ATLAS physicists were the stars!

“I have to warn you though, the Large Hadron Collider is asleep at the moment, so can you please lower your voices and walk on your tiptoes?” whispers ATLAS Outreach Officer, Claudia Marcelloni, as the programme opens over a sound bed of Hollywood-inspired eerie notes, sleigh bells, and the sound of cars racing past the Globe.

The Guardian crew were invited, along with other media, to meet some of those involved with the [Resonance music CD](#), but, admits Duckworth, “Yes, it was a brilliant excuse to come and see the place we’re always talking about on the podcast ... We wanted to allow our listeners to get a peek behind the curtain of one of the most amazing places on earth: a look at the human side of such a technical and enormous operation.”

This sense of awe was echoed by some of the physicists who took part in the recording. Lukas Pribyl enthuses: “It feels like working on a space station or something like that. It’s rather inspiring because you’re working with many people who are smarter than you and you can learn a lot from them.”

But of course, CERN is about as far away from a space station as you can get, aesthetically speaking, and it didn’t go unnoticed. “Part of me had expected neon lights everywhere, people walking around in space suits and robots roaming the corridors. I think I had expected to see a vision of the future from the 1960s!” jokes Duckworth. “Clearly, the ATLAS control room helped satisfy my futuristic desire.”

As the recording follows Duckworth on his visit to Point 1, Steve Goldfarb summarises for him: “What’s happening right now is... absolutely nothing ... [During the winter

shutdown] we start to lower the supply of helium to the accelerator. As it eats less and the temperature gets colder, it starts to fall asleep. It's much like a bear – a bear stops eating as it gets towards winter. Now the accelerator is in its cave.”

As well as touring Point 1, Duckworth visited Restaurant 1 to find out what physicists talk about over lunch, and sought out the corridor where the World Wide Web was invented. Speaking with various ATLAS physicists, he managed to cover topics such as working hours, how people plan their time, the international environment, working relationships, how people reacted to 'the LHC problem' in 2008, the male-to-female ratio, the Resonance CD, and, of course, the ubiquitous and endless meetings.

“If they took all the meetings out, do you think you'd have found the Higgs boson by now?” he asks a cool headed Nick Barlow. “I would like to say yes,” Nick laughs, “but sadly I think scientific honesty compels me to say no, we need a lot more data before we can find the Higgs.”

The physics on the cards did get a look in though, with SUSY, Dark Matter, and the quark gluon plasma seen in last year's Heavy Ion collisions all getting a mention.

“We weren't expecting, this year, to be doing discovery already – and we are!” enthuses Steve, before making a comparison between the detector and the Hubble Space Telescope, to illustrate the magnitude of the potential discoveries that await ATLAS: “We've taken our own Hubble, we've launched it and we're looking in. We're looking inside at the smallest parts of our universe, and trying to understand them. So I can imagine in the next couple of years, we're going to be finding all sorts of things. It's getting very exciting. It's opening our eyes for the first time on this universe that we've never ever seen before.”

“We're careful not to talk about [the LHC] all the time [on the show], but it always captures the imagination,” says Duckworth.

The Science Weekly team – no strangers to awards – think this episode (link) is particularly special, and have entered it for several prizes. “We'll find out later this year if the judges like it as much as we do. Fingers crossed,” says Duckworth. **Have a listen** for yourself!

Ceri Perkins
ATLAS e-News



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That was the news...

23 February 2011



It was almost ten years ago that then-Deputy Spokesperson, Torsten Akesson, asked Pippa Wells to become editor of the new 'ATLAS e-Newsletter'. Over the last ten years, the publication has accompanied ATLAS through construction, testing, puzzles, surprises, excitement, and finally physics. The magazine itself has morphed and changed along with the focus of the collaboration and now, as the e-News readies itself for its latest phase change, we take a little look back at what has gone before.

ATLAS e-News **began life** as a quarterly publication intended to help collaborators near and far alike keep up with the latest developments, designs, and discussions from their experiment. Lively and informal, it aimed to distil all that was going on into a neat little snapshot.

Articles in the early issues were mainly focussed on executive summaries from workshops and overview weeks, but also included progress reports on the manufacture, testing, and transport of various detector parts, test beams and other preparations for physics running. The **ATLAS cavern handover** and **the first cosmic seen through both the silicon detectors simultaneously** were particular highlights.

After three years as Editor, Pippa passed the baton to Jo Pater, who in turn eventually handed over to Pauline Gagnon, in May 2006. The essential format of e-News remained the same, but Pauline began to push for **more people-focussed articles**, aiming to give absent collaborators more of a feel for the fun things happening on-site at CERN and help people to make connections with one another. By mid-2007, eye-popping photographs from Claudia Marcelloni – the sort we've now all become accustomed to – **started to decorate the pages too**.

By 2007, so much news-worthy stuff was happening on the experiment, that Pauline decided to try to produce one issue per month. Towards the end of the year, and with the LHC looking set to start at any time, three **science journalists from London** – Colin Barass, Cristina Jimenez, and Ceri Perkins – were brought on board to help. This marked a big change for e-News; rather than having to write the content themselves, collaborators could be interviewed alongside others offering different perspectives in the same article, or receive help and guidance on feature writing. The idea was to make the publication more relevant, more dynamic, and less of a jargon jungle.

The journalists hit the ground running and within three weeks of arriving in Geneva, they had re-designed and **re-launched the single-page e-News into a website interface**, allowing readers to see content from the whole magazine on one front page, and pick and choose which articles were interesting to them, including a new 'Profiles' section. Having dedicated writers on board also meant that every exciting moment of the final construction and preparations for the LHC start-up could be covered, and in the year that followed, more issues were released (38) than had been in total since the e-News began (31). There was a **regular News from the Pit update**, more coverage of outreach events like the **2008 Open Day**, and we waited with baited breath as the **cavern was sealed** and **first beams arrived with much fanfare**.



In May 2008, Colin handed over his job to US-born Katie McAlpine in order that she get to stay working in Europe... a smart move, it turned out, as she later agreed to marry him. In the aftermath of the LHC 'incident', as activity and excitement died down and stories became more software-focussed, e-News was slimmed down to a 1.5-writer operation and a bi-weekly publishing schedule. Katie moved to London and contributed her unique blend of **pushing political boundaries**, expert LHC commentary, and tongue-in-cheek physics rap, from a distance. Word.

In April 2010, following two years with e-News, Katie left for a six-month internship with New Scientist and was replaced by upbeat writer and webmaster Birgit Ewert, whose favourite assignment is **writing profiles**.

ATLAS finally saw its first collisions at the end of 2009 and, after bearing witness to the **excitement in the Control Room** that day, e-News has been there at every step of the way: from the **first journal paper to be submitted**, through the **first W-boson candidate sightings**, via the world's best **limits on the hypothetical q^* particle**, to the **hunt for new states of matter**. The physics adventure has begun.

With Ceri Perkins moving on after over three years writing for the collaboration, it's time for e-News to contemplate where its own journey will lead next. If you would like to contribute comments or suggestions about how it should evolve to best meet your needs, please forward them to Birgit Ewert atlas-e-news@cern.ch.

Ceri Perkins
ATLAS e-News



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23 February 2011

Pauline Gagnon

Nationality: Canadian



Pauline and her mother, the only person who thinks Pauline is tall at 1.65 cm. Since her mother dislikes being the shortest on every picture, Pauline has her knees bent to be of equal height, making her mother very happy!

When exactly did her interest in science start, Pauline Gagnon cannot say. "I always wanted to know what matter was made of," she explains. Inspired by Marie Curie, her first choice was chemistry. No wonder that nine-year-old Pauline's dearest wish for Christmas was a chemistry kit. Unfortunately it said "Recommended for ages 10 and older" on the box. So her parents opted for a microscope instead and she had to wait another year to start chemistry experiments. "The best experiment was the one producing rotten egg smell – the whole family could tell it had been successful," she recalls. She kept the mortar and pestle from that chemistry kit and uses it today to ground spices.

That summer, her aunt told her about a new television show called: 'Atoms and Galaxies' due to start the following September. She thought these would be the main characters in a new adventure series so waited with anticipation. What a disappointment to find a rather boring man in a lab coat talking about absolutely incomprehensible stuff, as was common in the sixties. So she gave up after only one show.

In high school, her sister could not quite understand why Pauline was so attracted by chemistry "Why chemistry, at least physics is interesting!" Since she was one year older, she ought to know...

Pauline started studying physics without a clue what she could do with it and lacking support in general, although her mother had always encouraged her daughters to study, having herself gotten her degree after raising her five kids. "But it was very typical for French Canadians at that time not to set their hopes too high," Pauline explains. "Being a minority, French Canadians had less of a future. So none of my professors ever encouraged me to go any further than a bachelor degree."

She started writing for a **science magazine** to pay for her studies. "There was never a summer job for me so I created my own as a science writer." She finished her education with a bachelor in physics and taught in a college for the following six years. She would have stayed, but life had other plans: "I fell in love, quit my job and drove 7000 km to move to California," Pauline remembers. There, her friend suggested a visit to SLAC. Being very impressed and once again having to support herself, she decided to write an article about it. She phoned SLAC press office and made an appointment. "Here I was with my small tape-recorder – a total unknown, writing for an unknown magazine in Quebec. I could barely speak English and barely knew about quarks and gluons. And who did they line me up with but Martin Perl, who got the Nobel prize ten years later, Jonathan Dorfan, who became SLAC director and Helen Quinn, one of their most prestigious theorist!"

This was the main inspiration for going back to school. California also provided a very supportive climate for re-entry students. "One never knows where falling in love might lead you to!" So Pauline applied for a master in physics at San Francisco State University. "When I came to register, the department chair noticed I had taught in a college for many years. As they were short of a lecturer, he hired me on the spot. Teaching in English was very tough for me though as I always read the equations in French, even in English textbooks. Luckily there was always a kind student to read the equations aloud for me and slowly I learned the terms," Pauline recalls. "While taking a quantum mechanics class, I paid more attention to how the professor read the equations than to the lecture."

After completing her PhD in Santa Cruz, Pauline eventually came to CERN with her partner to work on the OPAL experiment and joined the Indiana University group in 1999. "I came for a year... 16 years ago." About five years ago, Peter Jenni asked her to be ATLAS e-News editor. "That was a great opportunity! When I took over, there were four issues a year but so much was happening, I proposed to do one issue a month. Soon, Ceri Perkins, Colin Barras and Christina Jimenez came on board, and we started covering every aspects, including social events and outreach issues. There is so much information in ATLAS, the goal is to give an 'executive summary'— a kind of snapshot of what is happening."

Over the last four years, Pauline split her time between research, ATLAS e-News and outreach. "I always enjoyed communication as a teacher, giving lectures to the general public, being an ATLAS guide or talking with journalists. Doing outreach keeps me in contact with reality."

It was her idea to mark **International Women's Day on 8 March 2010** at CERN, also followed by Fermilab. By showing how many women are working on the LHC, Pauline hopes to send an encouraging message to young women interested in science. In 2009, she suggested to a group of ATLAS women to join the '**Expand your horizon**' program in Geneva, where women scientists led hands-on workshops for young girls to inspire scientific careers.

To balance the long hours in front of her computer, Pauline loves all kinds of outdoor sports: running, biking, hiking and skiing – everything that can be done outside no matter the weather conditions. She participated in several runs, the longest being the Geneva marathon in 4:38 hours, and the strangest, a half marathon ending at 1:00 am in Tromso, Norway under pouring rain and not the advertised midnight sun!

Last December, Pauline decided to step down as ATLAS e-News editor: "It's time to give someone else the chance to bring their own new ideas," she says as she now plans to spend more time on her other interests.

Birgit Ewert
ATLAS e-News



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Technical teams working in the cavern during the winter shutdown



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Interviews for the Guardian Science Weekly podcast



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