Photo courtesy of Peter Steinberg

No mere cog: Blogging the LHC

With so much work to do on so many aspects of the Large Hadron Collider—the accelerator, detectors, software, physics, and so on—it's hard not to get a bit lost. It's a crowded field with thousands of scientists, all of whom have staked the next phase of their careers on the LHC, and all trying to finish many different things in the little time remaining until first collisions.

Still, I've rarely found a productive physicist who actually feels like a mere cog in a huge humming machine. Maybe the fact that most of the major discoveries in physics are ultimately attributed to individuals—however wrongly—lets us dream a bit. But it's probably more that as a practical matter, we each focus on a particular aspect of the physics at our machines. This lets us gain satisfaction through arriving at our own insights, which we then share with other small groups of colleagues and ultimately with the full collaboration.

Of course, with the machine coming online during the next year and no actual physics data to focus on yet, we are all taking on a wide variety of tasks in our working groups—two working groups, in my case.

I spend most of my time these days helping prepare a proposal for taking and analyzing data from collisions of lead nuclei using the ATLAS detector at the LHC. At the same time, I'm involved in preparing to look at similar data from the first proton-proton collisions at ATLAS. Even the most prosaic events from the first LHC data—those in which two protons shatter into hundreds of slow particles—give insight into basic features of the strong interaction that generates 99% of the visible mass of the universe (an oft-forgotten fact!). These reactions are not easily accessible to current theoretical approaches, but they are an essential part of the heavy ion program, which is my main focus at Brookhaven.

As it happens, these two aspects of my work involve entirely different groups of people at institutions all over the world. Yet despite "running" from meeting to meeting, I rarely leave my office chair, even on the busiest days. Instead, most groups interact via videoconference and teleconference. While this sounds somehow cosmopolitan and futuristic, it's often quite taxing ("Can you hear me now? Now?"). However, it has become a standard part of life in modern mega-collaborations. We develop longtime professional relationships with colleagues we rarely see in person. It's strange at times, though perhaps not any stranger than other modes of electronic life we've accustomed ourselves to, such as Facebook or iChat.

Despite all the meetings and communication in our lives, we all know progress isn't going to happen just by talking through technical issues, studying simulated events, or even making the detector perform as designed. It's also going to be found by looking at real data, in real time, and with hundreds of people looking over each others' shoulders. This is where blogging the LHC experience can play an interesting and novel role.

The earliest days of a new machine and new detector are hard to describe as they are happening. It is even harder to recall them in detail after things become better understood, roles and hierarchies become well-defined, and habits start to form. Robert Crease, the science historian, has suggested that "a scientific paper is more like a trial lawyer's concluding speech, recapitulating the argument—not the proceedings—in summary form and in the strongest way possible."

Thus, the fascination with the LHC should not just be in the results, per se, but in the false starts, inevitable stumbles, and occasional flashes of insight about the physics. Stay tuned to the bloggers, both official and not, as the LHC and its detectors rumble to life. They may well provide some real-time glimpses into the practice of nuclear and particle physics as it is experienced by individuals, rather than by large groups. Of course, some things will never make it out of the (virtual) conference room—collaborations always having their own secrets, and rules about revealing them—but intriguing details are sure to emerge.

Peter Steinberg of Brookhaven National Laboratory in New York is one of four American physicists who are blogging about what it's like to work at the Large Hadron Collider. See what they have to say at www.uslhc.us