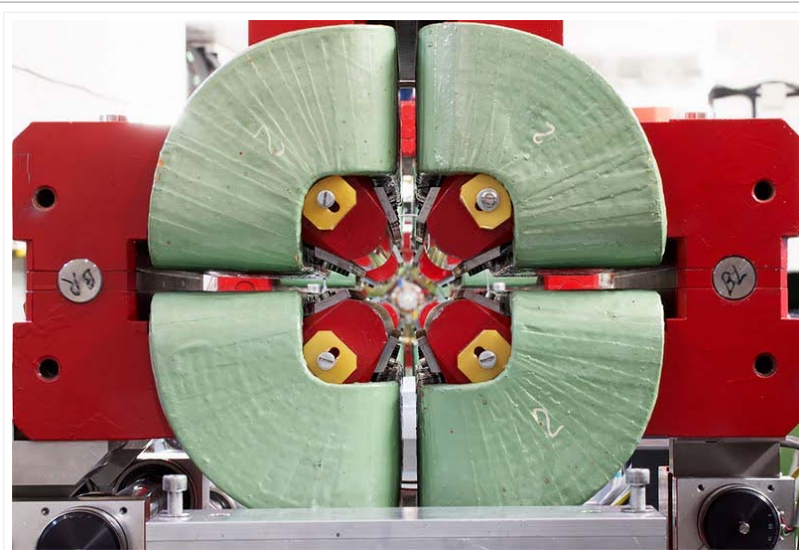


FRIDAY, NOVEMBER 13, 2009

Nobu Toge: Machine Portraits



Nobu Toge's lens peers through the final magnets of the test accelerator. (Nobu Toge/KEK)

For physicist Nobu Toge, a typical day of work at the Japanese [high-energy physics lab KEK](#) might involve attending a few meetings, calibrating a just-installed piece of equipment, or writing a report on the research's progress. But in the midst of it all, Toge might also pull out his always-ready camera and snap a photo of a gleaming piece of machinery, or a pair of technicians in bunny suits readying a component for testing. At the end of the day, reports and spreadsheets laid to rest, Toge will add the photos to [the thousands he's taken on the job](#) over the last seven or eight years.

A high-energy physics laboratory might seem an unlikely muse for a photographer. But just a glance at a few of Toge's photos might convince you otherwise. His images of scientific equipment are explorations of shape, form, and color. When you peer through his lens, you might find yourself awed by a long corridor of magnets as if it were the Grand Canyon, or admiring a vacuum chamber the way you might gawk at a dew-studded rose.





This beautiful abstraction is a close-up of a device that monitors components during cool-down. (Nobu Toge/KEK)

Toge is also a master at capturing his colleagues at work—the concentration lining a physicist's face as he fine-tunes a beam position monitor, or a technician's bemused expression as he handles a piece of equipment that looks like it was cribbed from Dr. Frankenstein's laboratory. There's a gentle humor in these photos, as if to remind us that, while the equipment may look cold, alien, and otherworldly, the enterprise of science remains quintessentially human.





Workers gingerly raise up a superconducting cavity to prepare it for testing. (Nobu Toge/KEK)

Here's what Toge had to say about being a scientist on the other side of the camera's lens.

How did you become interested in physics?

I found physics to be fundamental, and as such, when I was young, I thought I could easily associate a life worth significance with being into it. Now, I can tell I was really green to feel that way, but that is how I felt. Before then I thought a bit about going into fusion research (in high school and college), and before then I was interested in electronics and astronomy (in mid high school).

As a large particle physics lab, KEK is worlds away from most workplaces. Is there anything that still doesn't seem "normal" to you after having worked there for years?

Maybe it is worlds away, but KEK cannot quite complete its work without the help or participation by the ordinary people, whether technical or organizational. However, there are some hardcore people who are at the lab day and night even during the weekend. They are so dedicated to the research, or to be more exact I suspect they just do not know what else to do. And they call the people other than themselves "those civilians." Of course, it is a joke, but I love them. (No, I am not one of them.)

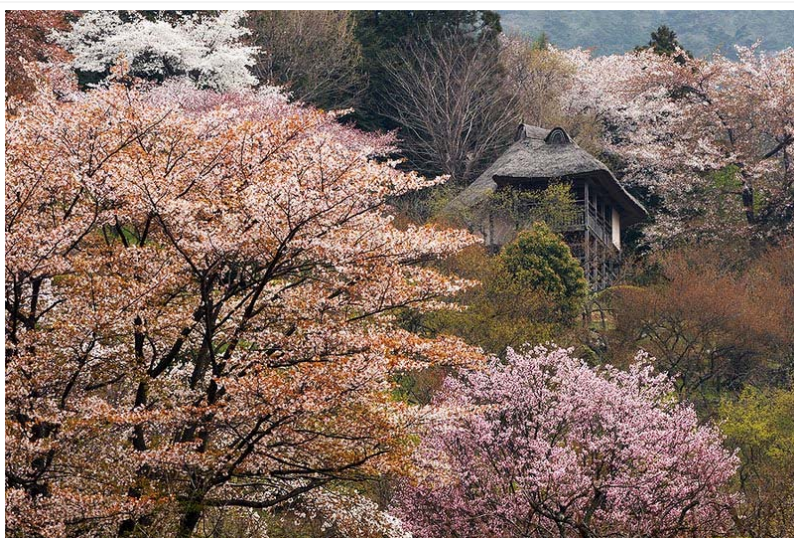


KEK staff align magnets for the Accelerator Test Facility 2. The precision required is

When did you first become interested in photography?

Some time ago when my children were very small and growing (they are still growing now, but not very small any more), I thought I should take their records. I used to think I always have a pretty good memory of everything, but I recognized that it wouldn't be that way for too long. This was about a bit over 10 years ago.

Besides family snapshots, I got into scenic photos, and I would drive my car for three hours to Nikko or North Ibaraki or Fukushima for shooting every other weekend or so. I'd leave home at midnight on Saturday so that I could catch the sunrise in the Sunday morning in Odashiro field in Nikko. In the first week in November, the first sunshine of the day comes onto a big, famous Japanese White Birch tree out there at just the perfect backlighting angle which I absolutely could not miss. Or in mid to late April some towns in mid-Fukushima would be practically completely buried under cherry blossoms, and so on.



"Kunimatsu district of Tsukuba city, known as Tsukuba Ume Garden. This area has a number of cherry blossom trees which bloom in mid-April." (Nobu Toge/KEK)

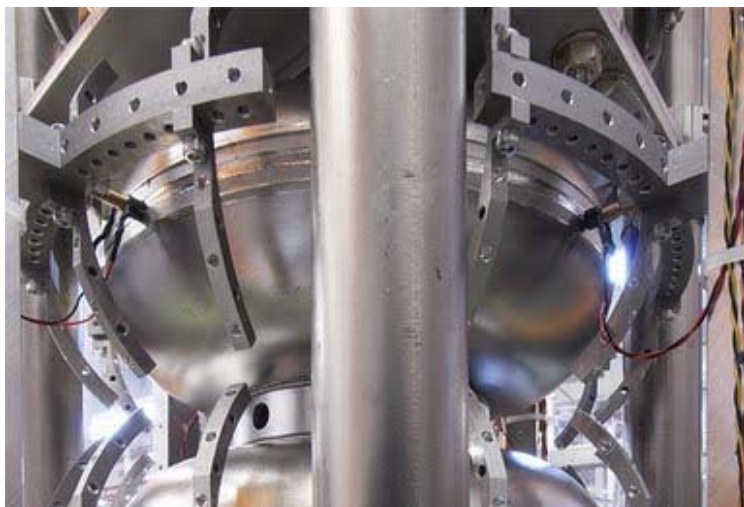
I inherited a medium format camera (Mamiya RZ67) from my father, and it was very heavy in a backpack but I loved it, since it would give an outstanding image when I got the framing and the focus and the exposure right, which would simultaneously happen perhaps once or 0.5 times per roll of 120 film.

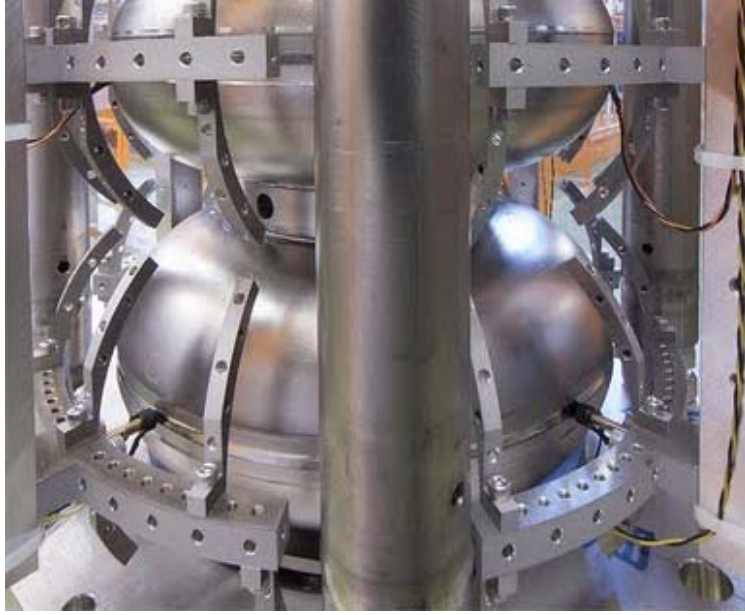




Toge's camera captures an early spring morning near MountTsukuba. (Nobu Toge/KEK)

However, then the work at KEK became much busier and I could no longer feel energetic enough to continue doing this weekend shooting tour. Out of frustration, I started looking for something to shoot and I noticed that there are many hardware pieces and the beamlines at the lab which are aesthetically very interesting. Almost all of them are placed inside buildings so I do not need to worry about the weather or the sunrise time etc. It turned out to be a perfect diversion on the weekends since I did not need to bother my colleagues there, either (except for those "non civilian" friends). This is about seven or eight years ago.





A superconducting accelerator cavity undergoing thermal tests. (Nobu Toge/KEK)

What do the other physicists think of your photography?

At first I was shooting at the lab only in the weekend, so very few people knew what I was doing. Then slowly I got more nerve and started shooting while they worked on weekdays, like during installation of major hardware equipment and so on.

By now, all in our group know that I am doing this and they have become pretty good at focusing on their work even while I am shooting, i.e. they now know how to ignore my existence with a camera, I think. And that is very good in terms of our not interrupting each other at a wrong time, and for me that is good for capturing their natural expressions.





Testing materials is essential to building great accelerators. This is sample broke during a low-temperature strength test. (Nobu Toge/KEK)

Now, every other month or so some of them come to me and ask if they can use my photos for their papers or presentations. That is when I see that they like at least some of my photos, and of course, they can use any such photos 100 percent of the time, since these are really theirs.

One of my colleagues told me that my series of assembly scenes of our cryomodule (horizontal cryostat) in August 2006 helped him grasp the big picture of the process. And he is one of the guys in charge of that entire assembly process who are supposed to have created that big picture. And I thought I was shooting photos of the details rather than a big picture. I felt that this slight mutual mismatch of perception both interesting and educational.



This "yellow submarine" is a cryomodule: inside are superconducting cavities, wrapped in insulation and cooled with liquid helium. Nobu Toge/KEK)

It seems like it would be difficult to take compelling photographs of scientific equipment. but you do it so easily. Is that a skill you've

had to learn over years of photographing KEK projects?

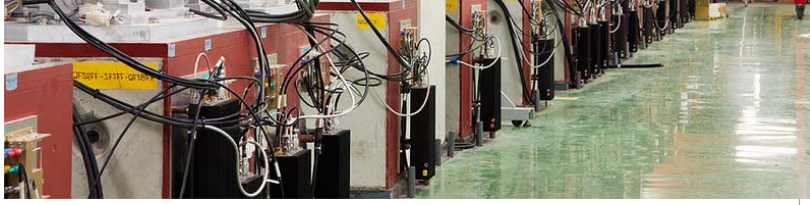
First off, scientific equipment is not boring. They have a reason to be there, to do some complicated things that not many others would do, and their existence is through someone's hard work, sometimes over years, and from that perspective there is always a view angle (or sometimes more) that they appear really precious, strong and beautiful. It is up to the person with a camera to know it or uncover it.



At KEK, even the most humble object is meticulously designed. This is a prototype for a grinder for delicately polishing uneven inner surfaces of accelerator cavities; under Toge's lens, it becomes a work of art. (Nobu Toge/KEK)

In a way this issue is similar to the scenic, or it is perhaps even more similar to portraiture. In practice, however, while shooting, I do not have time to think through these things really. I just keep taking as many shots as possible, while moving around in as many as possible different ways, until I think I "got it". Then, I continue shooting a bit more, just in case I get even better ones by chance, and after a few hundred shots finally I give it up. And usually it is the last few shots that turn out to be more or less OK.

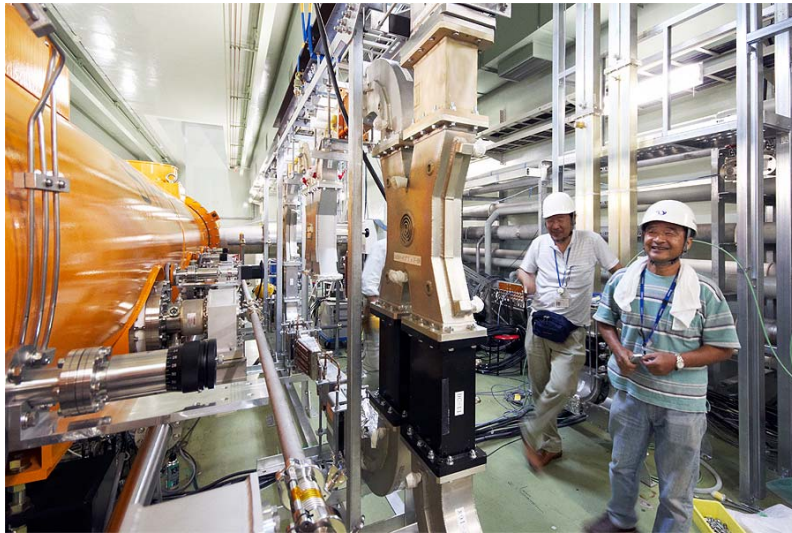




At the Accelerator Test Facility 2, a line of quadrupole magnets, which focus the electron beam to the size of a hair, extend into the distance. (Nobu Toge/KEK)

Does photographing KEK and the projects you're working on affect the way you look at your research?

Through the lenses, I think I have become more appreciative of people's efforts in building these many pieces of equipment and have become more caring for the colleagues who have been doing all these. I do not think one really has to take this many pictures to learn such a basic thing, but that is what happened to me.



Staff at the Superconducting RF Test Facility take a break from installing the waveguide system. (Nobu Toge/KEK)



Nobu Toge is a physicist at KEK, a high-energy physics lab in Tsukuba, Japan. Since the 1980s he has worked on machine design, commissioning, and operation of particle accelerators ranging from the SLAC Linear Collider in northern California to KEK's electron-positron collider. He currently works on the



[Superconducting RF Test Facility and the Accelerator Test Facility](#), technology testbeds for the proposed next-generation particle accelerator, the [International Linear Collider](#).

Posted by scappuccino at [5:47 PM](#)

Labels: [art and culture](#), [KEK](#), [particle accelerator](#), [subatomic](#)