

Francesco Ruggiero – My Dear Friend and Colleague

Weiren Chou (Fermilab)

Last E-mail from Francesco

Subject: Re: My best wish
From: Francesco Ruggiero <Francesco.Ruggiero@cern.ch>
Date: Tue, 05 Dec 2006 07:42:14 +0100
To: chou <chou@fnal.gov>

Dear Weiren,

thank you for your nice words (and for the postcard that I forgot to acknowledge some month ago). It is clear that I plan to return to CERN asap my health gets better.

cheers
Francesco

chou wrote:

Dear Francesco,

I heard some rumor that you do not plan to return to CERN due to health conditions. I am not sure if this is true. But I am very much concerned about it. I most earnestly hope that you will soon be better. Your smooth and successful recovery is in my prayer.

Best wishes,
Weiren

He wrote this e-mail on December 5, 2006, only a few weeks before his passing. He was still so optimistic, so upbeat about his return to CERN and continue to work on physics, something he loved so much in his entire life.

Our Friendship

- It all started in 1990 when I visited CERN for the first time.
 - Francesco was the impedance “Czar” of the LHC, I was his counterpart at the SSC.
 - He was my host and tour guide to the LEP tunnel. I vividly remembered that he pointed to the LEP dipoles that were largely made of concrete. I was so surprised and impressed.
 - Since then, we had many contacts and collaboration in the study of accelerator physics.
- Francesco had a nice and warm Italian personality, that made it very easy to be a friend of his. Gradually we not only talked about work, but also about our family and life.
- We had a mutual mentor – the impedance “Emperor” Bruno Zotter, who brought us closer.
- We had a mutual love – good food, because he was an Italian and I a Chinese. Every time we met, we went to restaurant together or invited each other for dinner at home.
- He liked my wife’s dishes, in particular shrimp and kung-pao pork. I was a fan of Italian wine, cheese fondue and everything Paula cooked in her lovely house in St Genis.

Snowmass 1996



From left to right: Holmes, Ruggiero, Ishimaru, Chou, Keil, Finley.

Summer 1995 at CERN

EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

CERN - Geneva, 9/8/1995

LHC Project Note 2 (SL/AP)

Anomalous Skin Effect and Resistive Wall Heating

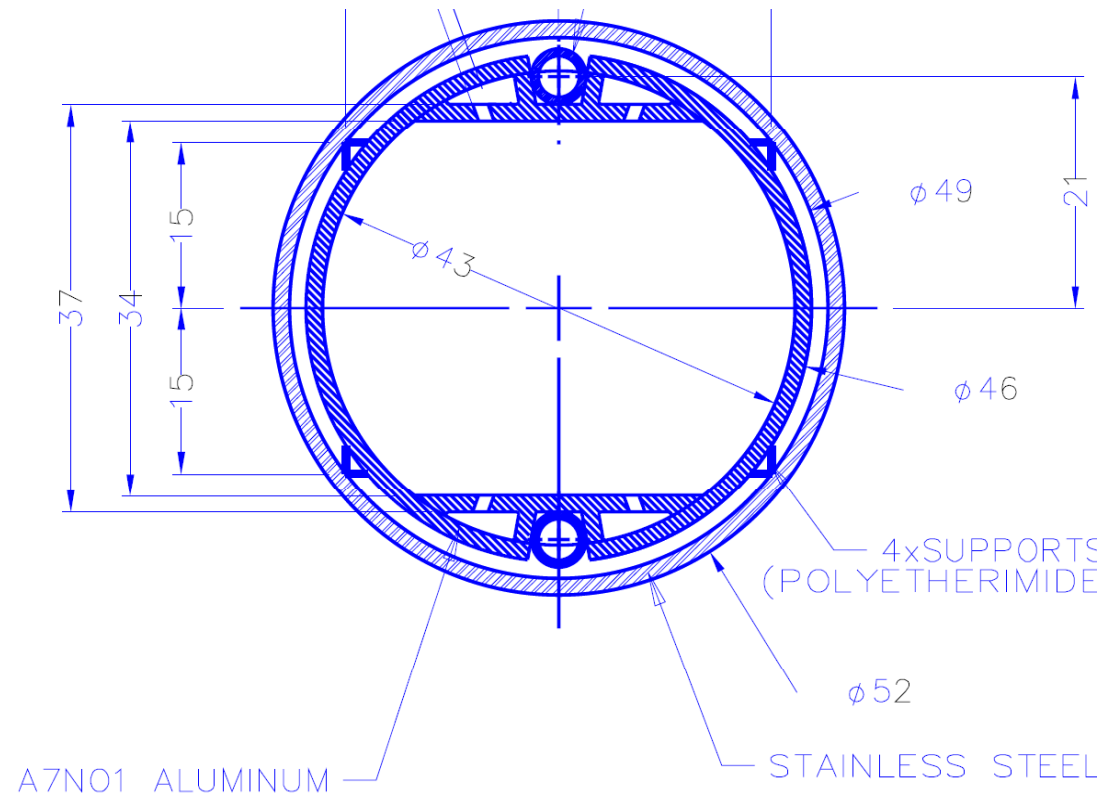
Weiren Chou¹ and Francesco Ruggiero

In the summer of 1995 I visited CERN and worked with Francesco on two things. One was resistive wall heating of the LHC beam screen. It discussed for the first time the combined effect of wall resistance under three extreme conditions:

- Low temperature (a few °K)
- Strong magnetic field (several Tesla)
- High frequency (fraction of GHz or above)

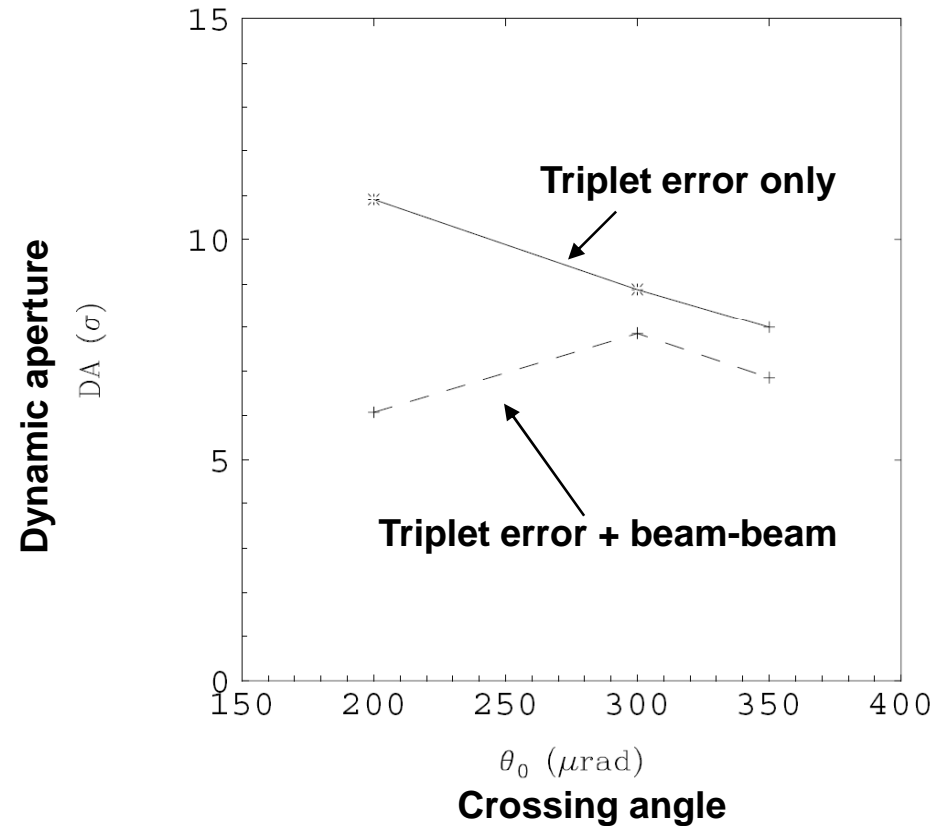
The result was published in the LHC Project Note #2. It led to the revision of the LHC cryo heat load budget.

Summer 1995 at CERN (cont...)



Another thing was the beam screen design. I tried to offer an alternative to the copper coated stainless steel pipe by an extruded aluminum pipe, which could get rid of the slots on the screen that might generate TEM wave coupling between the beam and pipe. But Francesco refused to promote this proposal. And, he was right! Otherwise we could be killed by the CERN management because of the later found electron cloud effect.

Collaboration on Beam-Beam



In the early days of US-CERN collaboration on the LHC, I worked with Francesco on dynamic aperture in the presence of beam-beam effect. When I presented him the above plot, he immediately realized the seriousness of the problem and launched a simulation study at CERN. As a result, it was proposed to change the crossing angle in the baseline design from 200 to 300 μrad , which was later approved.

Collaboration on Beam Screen Impedance

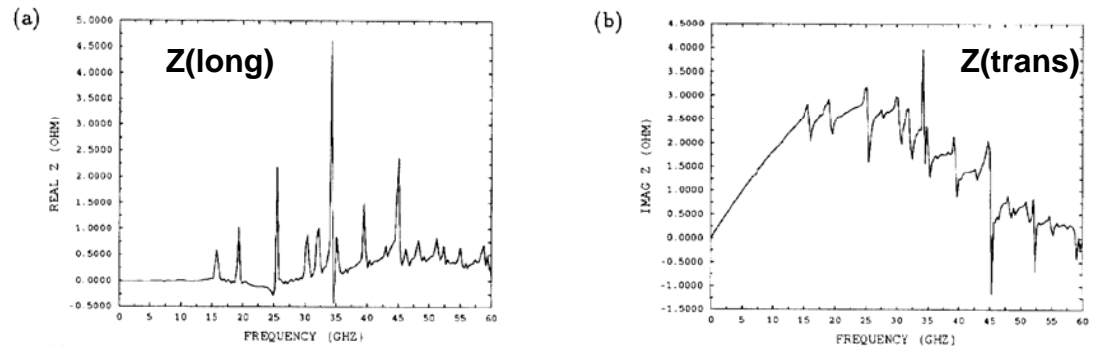
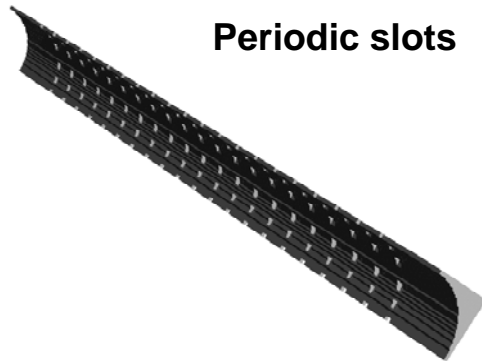


Figure 3. The longitudinal impedance for a liner with 420 square holes (2mm), periodically distributed.

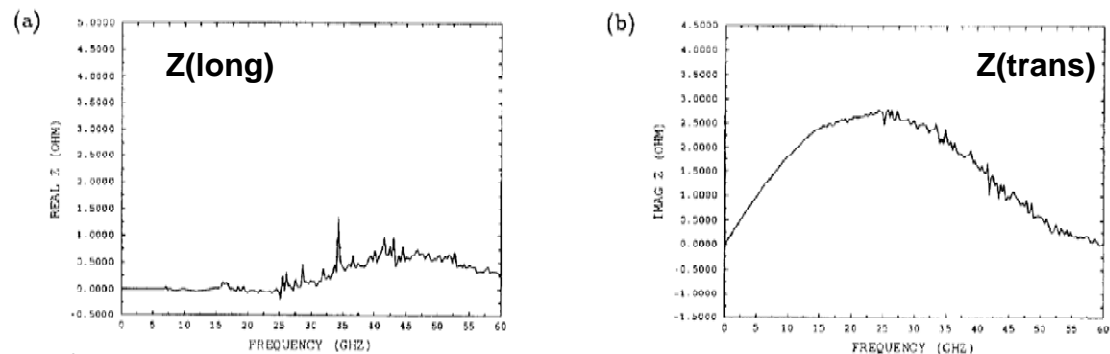
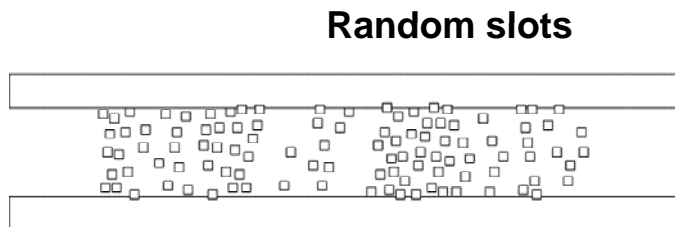


Figure 4. The longitudinal impedance for a liner with 420 square holes (2mm), randomly distributed.

We spent a lot of time together on the calculation of beam screen impedance, in particular, how to minimize it in the slot design. We compared different lengths, shapes and distributions of slots and concluded that the short, racetrack-shaped, randomly distributed slots would be the best choice. This design was adopted by the LHC.

A Friend Forever

- Francesco and I worked together on many things. Most times we agreed with each other. Some time we disagreed. But then it turned out that he was right and I was wrong (example: aluminum beam screen).
- In November of 2005, we met in Daegu, South Korea for an ICFA Seminar. I noticed he had lost a lot of weight. He explained he was in hospital for a long time and almost died. But he assured me that he was all right by then. I blamed him not to inform me when he was in hospital. He promised me that would not happen again.
- The last time I met him was in the spring of 2006 in Paula's house when he invited me for a dinner. It was a lovely evening and I enjoyed every moment of it. But I did not realize this would be our last meeting.
- Francesco was a great guy. He was talented but humble, sincere but warm. No matter where he is, on the earth or in the heaven, he will be a good friend of mine forever.
- Dear Francesco, sleep well and good night!