Short-stay Study Abroad Program

Completion Report

CERN Accelerator School
Advanced Accelerator Physics 2017
Royal Holloway University of London, Egham UK

3 – 15 September 2017

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Contents

1 Motivation and Preparation **3**
1.1 Relevance of Short-stay Study 3
1.2 Preparation before leaving Japan 3

2 Study during the stay **4**

3 Other Activities **5**

4 Expenses **5**

5 Language, Difficulties and Advice for future applicants **5**
5.1 Language 5
5.2 Difficulties 5
5.3 Advice for future applicants 5

6 Photos taken during the program **5**

School and Department	:	School of High Energy Accelerator Science Accelerator Science Department Doctoral course 3rd year of 3-year PhD course
Name	:	Emy Mulyani
Destination Country	:	UK
Receiving University/Institute	:	CERN Accelerator School Royal Holloway University of London
Period of Study	:	3 – 15 September 2017
Date of Report	:	21 September 2017

1 Motivation and Preparation

1.1 Relevance of Short-stay Study

The CERN Accelerator School (CAS) Advanced Accelerator Physics course is a follow-up of the Introductory level course and is composed of core lectures on accelerator physics in the mornings and a practical course (14 - 16 hours of hands-on tuition) in the afternoons. The participants select one afternoon course from the three proposed (Beam Instrumentation, RF, and Optics system). For the afternoon courses, the basic idea is that the participants select a topic for which they have no or very little preliminary knowledge. This should allow the participants to discover and get training in a new field of accelerator physics. A series of seminars and tutorials will complete the programme.

The topics of my research is vertical beam size measurement using x-ray monitor (XRM) for the SuperKEKB Accelerator. The XRM is a device dedicated to measuring e- e+ vertical beam size in the SuperKEKB storage ring using Synchrotron Radiation (SR), it is necessary to keep a precision measurement of vertical bunch size that plays an important role in the design and operation of the storage ring facilities (include a SuperKEKB). By joining this school, I expect to get more knowledge in core of accelerator physics, understanding on measurement principles that might be potential in the future works and also experience in practical course.

1.2 Preparation before leaving Japan

I had heard about the short-stay study abroad program that was held by SOKENDAI. This program aims is to provide opportunities to pursue in institute abroad and covers all expenses such as transportation, accommodation, and others during the stay in another country for study (based on the regulation for this program). I read information about the CAS and discussed with my supervisor, then I decided to apply for this program. After the school final announcement, I requested an acceptance letter which was then used for the grant and visa application. In my case, I need visa to enter UK with several steps as below:

1. Visit the UK government website for visas and immigration in Japan and apply for a visa (https://www.gov.uk). I did a payment for this application, which is £89 for a standard visa (short stay).

2. To complete the application process, I must book and attend an appointment at the visa application centre in Japan. All UK visa applicants are required to book an appointment prior to submission.

3. Enrol the fingerprints and photograph (known as biometric information collection) at the visa application centre on the appointment day.

4. The announcement of the visa application was around 10 days.

After I got the visa, a room at the Royal Holloway University (RHUL) hostel as well as a flight were booked.

2 Study during the stay

The CERN Accelerator School (CAS) holds training courses in accelerator physics and associated technologies for physicist, engineers, technicians and students. For 2017, CAS in collaboration with Royal Holloway University of London (RHUL) organizes a course on advanced accelerator physics . The advanced Accelerator Physics is composed of core lectures on accelerator physics in the mornings and a practical course on beam Instrumentation and diagnostic in the afternoons. Programs for advanced accelerator physics from 3 – 15 September 2017 are below:

1. Morning session lectures
    - Transverse beam dynamics
    - Beam Instrumentation and diagnostic
    - Optics design
    - Lattice cells
    - Insertion device
    - Wake-fields and impedance
    - Space charge
    - Longitudinal beam dynamics
    - Non-linear dynamics
    - Beam instabilities
    - ERL, Landau damping
    - Feed-back system
    - Electron cloud and instabilities
    - Beam-beam effect
    - Timing and Synchronisation
    - NLD methods and tools
    - NLD phenomenology
    - Beam cooling
    - Advanced magnet technologies
    - Low emittance machine
2. Afternoon session courses (3 groups)
    - Beam Instrumentation (BI)
    - RF Measurements Technique
    - Optics Design and Correction.

    On the BI course we learned about BPM simulation, Bunch profile measurement, and Beam emittance and beam profile monitors. On RF measurement technique, we learned the Modulation and Network analyzer systems. An accelerator sample and an interactive simulation tool are provided for generating and understanding of beam signals, and constructing the acquisition systems for beam position, beam intensity and transverse diagnostics. On the final day, each small group did a report and presentation.

3 Other Activities

The schedule of CAS school was tight from morning to night, so we didn't have enough free time. On Sunday, September 10th we had an excursion day to visit the Windsor castle and tried the River Thames boat trip. On the second week, Wednesday September 13th we had free time after 14:30, then I went to London down town with some friends.

4 Expenses

Table 1 lists all expenses for travel, registration fee and accommodation. SOKENDAI covered mostly expenses as described in the regulation for this program.

Table 1: Expenses of short-stay study at RHUL Egham UK.

Purpose	Amount	Currency
Transportation to and from airport in Japan	5680	Yen
Flight from Narita to Heathrow (one round-trip economy class)	178 010	Yen
Transportation to and from airport in UK	8.1	Pounds
Registration and accommodation fees	2000	CHF
Bank transfer fee	6500	Yen
Visa application fee	89	Pounds
Travel Insurance fee	25	Euro

5 Language, Difficulties and Advice for future applicants

5.1 Language

Language used during the school and on a daily basis was English.

5.2 Difficulties

No actual difficulties occurred.

5.3 Advice for future applicants

The short-stay study program affords students the opportunity to study and share our research with researchers in abroad. I recommend the SOKENDAI student to join this program and make good preparations (research goal, financial planning, accommodation, international/local transportations, etc). Some local buses in UK (especially in London area) only accept the payment by card that you can buy at train/bus station, so beware about it.

6 Photos taken during the program

Figure 1: The main gate of the RHUL with the founder building in the background. The building was officially opened in 1886 by Queen Victoria.

Figure 2: The Founder building, icon of the RHUL.

Figure 3: Badge to access to the building and participation in seminars. Anyone without a badge will not be able to access conference sessions or events.

Figure 4: Hostels building for the participant (Butler and Tuke), the Hub building is the information centre for check-in/out, do laundry, buy meals etc.

Figure 5: Hall for morning courses, located in Moore Building.

Figure 6: Afternoon courses, for beam Instrumentation and RF groups it was located in laboratory of Physics Department.

Figure 7: 1 day tour to visit windsor caste and tried boat trip along the river thames in windsor.

Figure 8: The Big Ben, icon of London.