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Host and host institution: Professor Katsumi Midorikawa, Laser Technology Laboratory, RIKEN.

I spent three months (from July to September) in the Laser Technology Laboratory, RIKEN, in Saitama, near Tokyo. My research interests are focused on the interaction of high-power lasers with atoms and molecules and, in particular, the implementation of ultrafast measurements in molecules through high-order harmonic generation. This is a new area of physics that is progressing very quickly in parallel with developments in laser technology, and it is opening the possibility to measure fundamental processes of matter, like electronic excitations in molecules, with an unprecedented time resolution.

The group of professor Midorikawa in RIKEN is one of the world leaders in experimental attosecond science, that is, the generation and application of laser pulses of attosecond time duration (one attosecond = one trillionth of a second). In attosecond science there is a strong interaction between experiments and theory, so computer simulations are essential to interpret experimental data. One of the main goals in this field is the production of high intensity laser-like X-ray pulses with a duration of less than one femtosecond, and the approach followed by professor Midorikawa's group is to synthesise such pulses by high-order harmonic generation with a combination of laser fields of different wavelength. My project was mainly theoretical and consisted on applying computer models to simulate the experiments that were being carried out in RIKEN and guide future experiments. This work has been extremely useful for my own research at Imperial College and also to start a regular collaboration with RIKEN.

The experience of living and working in Japan has been a most enriching one. Coming from a European country, the idea of being immersed in such a different culture may be a little scary at the beginning, but the friendliness of the Japanese people makes you feel at home immediately. In the workplace the language barrier may make it difficult to work in a team so it is important to be able to work on own initiative. Outside work, the difficulties with the language were for me more a source of anecdotes than a cause of real problems. The summer was extremely hot and humid so you have to take some precautions like wearing fresh clothes and taking enough liquids but is an excellent opportunity to visit the places around, there is so much to see and enjoy in Japan.

