Reciprocal Space

Kristian Rother (2008)

Two crystallographers sat at a beamline of the novel linear accelerator. With two freshly brewed cups of coffee steaming on the desk beside each other, one prepared the program for recording, while her colleague was pushing a cart with a cryo vessel. Both had dressed up for this big day, and the ceremony they were expected to take part in afterwards. She wore a violet jacket, and a necklace with a small lapis. Her fingers were carefully prepared, and she took care not to damage her nails on the keyboard. He had a comfortable suit in a marine blue that fitted his shirt. She noticed a rare scent of orange from a perfume she liked.

The results were to be a scientific revelation expected with tension worldwide. Nobody had carried out a crystallographic experiment on a linear accelerator with a coherent x-ray beam before. Some people even claimed it should be possible to resolve an atomic structure from a single molecule with this technique – if it worked at all.

Humming a small tune, he took his coffee cup to the x-ray chamber and started attaching the crystal to the goniometer. Slightly obscured by chill jets of nitrogen gas, the crystal was gently lifted into its hold. It was a perfect crystal, with evenly shaped parallel faces, and of a brillance that would have let daylight pass through almost unobstructedly – not that it would have seen much daylight before, or ever would. Too precious the beautiful item was, but still to be sacrificed the same day.

In a few minutes, the accelerator would power up, open the shutter door automatically, and deliver a package of coherently oscillating photons to their destination. The unleashed energy hitting the crystal would cast a web of interfering waves across the room, and, according to the laws of Fourier mathematics, recreate itself as a matrix of tiny spots of light. There, all its existence would be caught in an inverse dimensionality, as a negative image in space and time. The shadow of the crystal would be turned inside out, as if it was a bedcloth with two extra dimensions. An array of detector plates stood ready to record the reflections of the beam, catch all these tiny sparks of starfire to unravel the crystals inner self.

With everything in place, the pair of crystallographers checked all parameters of the experiment carefully. He was standing behind her, both nodded in agreement, and they decided everything was ready to begin. „Now I just need my coffee“, he said. It was only seconds after she had initiated the beam sequence, when she realized that her colleague had returned to the x-ray chamber.

The door fell shut and locked immediately. A rack of light bulbs on top lit up. The woman jumped up, and reached for the emergency switch and pressed. All computers and lights, except for the emergency illumination fell dark. But the instrument panel of the accelerator indicated that the beam sequence was still going on. She pushed a second, a third time, looked hastily for another switch, but there was none. A distant vibrating noise rose when several miles of superconducting coils took up their work. She started bashing at the metal door of the chamber, ruining her nails, and shouted. The ventilation system responded like an echo. Paralyzed she tumbled back to the wall, staring at the door. Then, there was a sudden burst of sound from beyond, and then silence.

When the crystallographer entered the x-ray chamber, it was empty. Only the goniometer with the remains of the crystal and the gas jets still steaming. A cloud of coffee smell was hanging in the room. She turned and left, but as she turned, it was like there was somebody standing behind her. Crossing the room, she thought she would hear a melody sung from afar. When she reached for the door handle, it was warm, as if it had been touched moments before. And every now and then on her way back, she noticed a fresh scent of orange, that she liked.