

Poster Presentation

MS032.P03

Training course in symmetry and group theory in Japan

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On the occasion of the International Year of Crystallography, we launched a series of training courses on symmetry and group theory, sponsored by the Crystallographic Society of Japan and the High Energy Accelerator Research Organization, offering a detailed introduction to crystallographic symmetry covering topics in Volume A and A1 of the International Tables for Crystallography. The first course was held on August 2014, right after IUCr congress in Montreal; since then, the course has been held bi-annually on March and August. The response of the public has been surprisingly enthusiastic, to the point that the available places (from 40 to 60, depending on the venue) are filled in a few days, and often in a few hours, from the opening of the registration. Participants span a very wide profile, from undergraduate students to full Professors, and include also scientists working in private companies. The background is also very large, from mineralogy to material science, from chemistry to biochemistry, from physics to engineering. The program of the course is articulated in several topics:

basic notions about abstract algebra

introduction to crystallographic symmetry

crystallographic point groups and stereographic projection

analysis of space group diagrams: from the Hermann-Mauguin symbol to the projection of the general position and vice-versa

metric tensor and change of reference

matrix representation of symmetry operations

normalizers of point and space groups

Wyckoff positions and crystallographic orbits

polar and reciprocal lattice

geometric derivation of reflection conditions and determination of space group symmetry from the experimental reflection conditions

subgroups of point and space groups

derivative structures and structural phase transitions

The training course has so far been held five times. After the first four courses, an advanced course, addressed to previous participants of the basic courses, has also been held, with topics covering polychromatic point groups, twinning, and an introduction to the Bilbao Crystallographic Server. Starting from the fifth basic course, the training course has become part of the education provided by Sokendai, the Graduate University for Advanced Studies: university students can get credits through this university for attending the training course. The content of the lectures is now being published in a series of didactic articles in the Journal of the Crystallographic Society of Japan.

This on-going series of training courses has pointed out some aspects we believe are the reasons for its success:

1- most of the participants are facing difficulties in their experimental work coming from the lack of crystallographic education in the university curricula;

2- offering the training course in the native language of the participants represents a strong motivation, especially when the participants' mother tongue is very far from English.

We believe that our experience may be useful to institutions that may consider launching similar initiatives. A critical point would however be the formation of lecturers who may then run training courses in their respective languages. Such an initiative would best be run under the IUCr auspices.

Keywords: [crystallographic education](#), [symmetry](#), [group theory](#)