

SIG No: 4

Reported Period: 2014-2015

Report Date: 31.07.2015

Reported by: Holger KLEIN

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1. Introduction. (50 words max.)

The aim of SIG#4 is to raise the awareness and acceptance of Electron Crystallography to a rank comparable to X-ray crystallography. This requires concerted efforts of groups and researchers in this field and external support. Our purpose is the realization of the full potential of electron optical methods in structural research.

2. SIG web site:

SIG 4 url: <http://sig4.ecanews.org/>

3. Number of ECA individual members registered with the SIG according to (<http://www.xray.cz/eca/im-payment.htm>)

SIG 4	electron crystallography	10
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4. Existence of a SIG mailing list X Yes / O No

Address of the mailing list: ecaelectronsig@iucr.org

Number of members in the SIG mailing list: 45

5. Approximate total number of researchers involved in the SIG (please indicate the basis for the estimate)

45 researchers (mailing list)

6. List of MS organized by the SIG at the last ECM

MS15 Electron microscopy for aperiodic structures

MS16 X-rays and electrons: joining forces

MS17 Combined methods for soft matter crystallography

7. Prizes sponsored/coordinated

8. Past Activities other than Microsymposia at ECM

Microsymposia at IUCr XXIII:

MS24: New 3D electron diffraction techniques and their potential for structure solution of nano- and micron-sized crystals

MS60: Electron crystallography and X-ray powder diffraction – two complementary techniques for structure solution of nano- and micron-sized crystals

9. Future/Programmed Activities.

Title: Electron Crystallography School ECS2015

Number of participants: 28

- ECA members organizers
- ECA members lecturers

The school is organized as a satellite event to European Crystallographic meeting – ECM29. The program of the school comprises 3 days of lectures and tutorials and is structured as follows: each of the three days, a set of 4 lectures are given during each morning while the afternoon sessions are

devoted to tutorials. The first day lectures are devoted to basic crystallography concepts and specifics of their application to electron diffraction. The second day lectures cover the structure solution methods and their use for structure analysis based on electron diffraction data. The third day lectures deal with specific crystallographic problems – lattice defects, modulated structures and poorly crystalline materials, seen by electron scattering. Tutorials will be given in small groups and interactive manner in order to encourage active discussions. A poster session gives students a possibility to present their research to the lecturers as well as to other participants.

Title: International School on Fundamental Crystallography with applications to Electron Crystallography

University of Antwerp, from 27 June-2 July 2016

- ECA members organizers
- ECA members lecturers

Title: PDF analysis of amorphous and nanocrystalline material from electron diffraction

August 24, 2015, 12-3 PM, Rovinj, Croatia

Website: <http://www.nanomegas.com/amorphousPDFworkshop/Workshop/Workshop.html>

- ECA Individual Members registered with the SIG involved in the organizing committee
- ECA Individual Members registered with the SIG involved as lecturers

It is known that in amorphous materials crystalline order exists only at short range scale and conventional X-ray diffraction does not bring structural information as there is lack of clear Bragg reflection peaks. Pair distribution function analysis (PDF) from total scattering experiments can be used to understand the type of ordering present in these types of compounds ; this can be done usually with conventional Mo/Ag X-ray diffraction or using synchrotron facilities. As an alternative, PDF analysis based on electron diffraction in any transmission electron microscope (TEM) can be used to study local order. The main advantages of using electron diffraction for PDF analysis is the very quick data acquisition time (from few msec to 2-3 minutes per ED pattern) and possibility of probing small nm size areas. The workshop will provide an opportunity to learn how to analyze different diffracting systems (nanoparticles, amorphous glasses, minerals, pigments etc..) using TEM electron diffraction PDF techniques. Software to analyze PDF will be demonstrated (PDFgetEGui) following practical hands-on session with limited number of participants (30). Emphasis will be given to discuss scientific problems between participants and invited specialists.

CrystElec 2015 : Ecole de Cristallographie Electronique

16-20 Nov. 2015, Villeneuve d'Ascq, France

- ECA members organizers
- ECA members lecturers

10. Other matters. (50 words max.)

11. Brief annual activity report (100 words max.)

After a very active year 2013-14 with many workshops and schools organized by the members of SIG#4, this past year was quieter. We participated in the organization of microsymbosia at the IUCr conference in Montreal, Canada, in 2014 and the ECM29 in Rovinj, Croatia, in 2015. We are especially interested in interdisciplinary microsymbosia in order to disseminate knowledge of electron crystallography to other communities. Several schools that include electron crystallography are being prepared for next year.

12. List SIG officers, name and e-mail, and specify their main function in the SIG:

Holger KLEIN, holger.klein@grenoble.cnrs.fr, chair

Mauro GEMMI, Mauro.Gemmi@iit.it co-chair

Lousia MESHI, Louisa@bgu.ac.il secretary

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