



Report on the XXIII Czech–Polish seminar: structural and ferroelectric phase transitions, May 21–25, 2018, Kouty, Czech Republic

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Report on the XXIII Czech–Polish seminar: structural and ferroelectric phase transitions, May 21–25, 2018, Kouty, Czech Republic

The Czech–Polish Seminar entitled ‘Structural and Ferroelectric Phase Transitions’ has a long-standing tradition. It has been organised for almost 40 years as a result of a strong cooperation between the Institute of Physics of the Czech Academy of Sciences in Prague [1] and the Institute of Molecular Physics of the Polish Academy of Sciences in Poznań. The seminar is organised every two years, alternating between Poland and the Czech Republic. The last seminar took place in Kouty about halfway between Prague and Brno in the centre of the Czech Republic. The single-session conference was organised at Hotel Luna located in a quiet place at a pond, surrounded by green forests. The 23rd Seminar started on the 21st and finished on the 25th of May 2018. The previous three seminars were organised in Hucisko in 2016 (Poland) [2], Sezimovo Ústí in 2014 (Czech Republic) [3] and Ustroń in 2012 (Poland) [4]. The conference history is connected with a number of remarkable names in the field of dielectrics and ferroelectrics [5–7]

The seminar was mainly devoted to polar effects in solid state crystals but traditionally there was also an interesting session devoted to polar effects in soft matter. It was very motivating for people involved in liquid crystal science to listen and discuss about properties of solid state materials. The multidisciplinary nature of the topics was definitely an advantage of this seminar so that the meeting facilities were always busy.

The Czech–Polish Seminar hosted around 110 participants from 14 countries. The biggest delegations obviously arrived from the Czech Republic (45 participants) and Poland (37). But there were also participants from Germany (6), the USA (6), Austria (3), the Russian Federation (3), Switzerland (2) and Hungary (2). One researcher per country arrived from Croatia, France, Ireland, Japan, Israel and Luxembourg. One can say that the Czech–Polish Seminar was truly an international event (Photo 1).

The conference programme was broad and diverse. The schedule included 54 oral presentations of different lengths, from short 10-minute reports to 40-minute plenary lectures. In addition, 59 posters were presented and discussed during two poster sessions.

The seminar was opened with an interesting guest lecture by P. Paruch entitled, ‘Nanoscale Studies of

Novel Functional Properties at Ferroelectric Domain Walls’. One could notice several interesting presentations about liquid crystals in the seminar’s schedule. A. Emelyanenko presented a theory of transitions between smectic, nematic and isotropic phases and discussed a molecular-statistical approach to the description of various smectic phases and transitions between them. K. Merkel discussed the molecular origin of various layer contractions at the SmA-SmC transition. V. Novotná presented supramolecular self-assembly of liquid crystalline molecules that create nanotubes. A. Bubnov presented the self-assembly behaviour of new photosensitive cinnamoyl-based monomers aimed for the use with smart molecular materials. P. Perkowski presented a contribution on the difference in dielectric response of a pure enantiomer versus its racemic mixture, while D. Dardas discussed electro-optic and viscoelastic properties of a ferroelectric liquid crystalline binary mixture. W. Piecek outlined a study of quartenphenylene-based derivatives forming ferroelectric smectic phases of the de Vries-type and S. Róžański discussed dielectric properties of laterally fluorine-substituted bent-shaped liquid crystals. The influence of racemic mixtures on the properties of a high tilted antiferroelectric liquid crystal W-1000 mixture was discussed by M. Żurowska, whereas J. Fitas presented physical and electrooptical properties of two sets of newly synthesised ferroelectric liquid crystal mixtures and S. Suwa introduced new liquid crystal alignment technologies for VA LCD. Photo-induced structural transformations in nematic liquid crystal droplets containing azobenzene polymers were presented in a contribution by S. Shvetsov. D. Jukić discussed a theory of relaxation modes of banana-shaped SmAP_A, SmC_AP_A and SmC_SP_A phases, while M. Kurochkina presented structural and electro-optic features of nonsymmetric azobenzene-based bent-core ferroelectrics. In general, one can conclude that in accordance to the title of the seminar series, polar effects in liquid crystals, chirality and photosensitive properties of soft matter were hot topics at this meeting.

Presentations on solid-state materials involved a diverse range of topics (Photo 2). P. Paruch and Y. Ivry discussed various aspects of domain structure in



Photo 1. Group photo of all participants of the Czech–Polish Seminar 2018 (photo by Jan Pokorný).



Photo 2. Full lecture room at a morning session of the conference (photo by Jan Pokorný).

prototypical ferroelectric materials $\text{Pb}(\text{Zr,Ti})\text{O}_3$ and BaTiO_3 . D. Nuzhnyy presented his observations on a soft-mode-driven phase transition in nanodomains of relaxor ferroelectrics and B. Dabrowski outlined the relation of tolerance factors and structural phase transitions in perovskites. An overview of skyrmions and antiskyrmions in crystals with axial symmetry was given by I. Kézsmárki and M Guennou summarised the general ideas on antiferroelectricity and related phase transitions. F. Kadlec, S. Skiadopoulou and J. Vít discussed electromagnons in multiferroic materials. W. Widdra presented new data obtained by inelastic electron scattering, revealing characteristics of surface phonons in perovskites and I. Jankowska–Sumara discussed her high-pressure Raman experimental data of antiferroelectrics. K. Roleder introduced $\text{Pb}(\text{Zr,Ti})\text{O}_3$ single crystals with a huge piezoresponse and J. Pokorný discussed the specific behaviour of water layers at charged surface.

Conference presentations, after a strict review process, will be published as a special issue of the journal *Phase Transitions*, by Taylor & Francis.

During the seminar, participants visited the castle of the Sternberg family in Český Šternberk (Photo 3). A member of this family, George of Poděbrady (Jiří z Poděbrad) was a king of Bohemia in the 15th century. He was a leader of the Hussites and the first king of a medieval European kingdom to adhere to a creed different from Roman Catholicism. He is known for his idea and attempt to establish common European institutions which is considered the first historical vision of European unity.

Participants of the seminar were very well taken care of in a convenient conference hotel, including good accommodation and meals. The organisers invited participants to take part in a competition of the best at 'who knows song titles, their authors and interpreters', led by Jan Pokorný. Every evening live music sessions were organised and the Conference Dinner stimulated dance, but also further scientific discussion. The meeting was a great opportunity to meet old friends, discuss new ideas, present novel results and make new friends. We are looking forward to the next, the 24th seminar, which will be organised in Poland in 2020.



Photo 3. Castle of the Sternberg family in Český Šternberk (photo by Jan Pokorný).

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