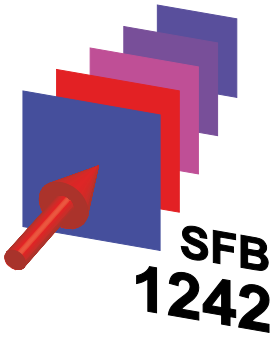
International Symposium

Ultrafast soft x-ray spectroscopy and scattering

January 27, 2017
University of Duisburg-Essen



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Organisation and Contact

and the 80th anniversary of

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Friday, 27 January 2017

13:30	Welcome and Introduction **Uwe Bovensiepen**

Chairperson: Heiko Wende

13:40 **J. J. Rehr**
Calculations of X-ray Spectra in Real-space and Real-time

14:20 **J. W. Freeland**
Ultrafast Control of Phases in Complex Oxide Heterostructures

15:00 **A. Scherz**
Spectroscopy and coherent scattering with X-ray free electron lasers

15:40	Coffee

Chairperson: Michael Farle

16:20 **Th. Rasing**
All-optical Control of Magnetism: From fs magneto-optics to fs-XMCD

17:00 **A. Rogalev**
Polarization dependent X-ray spectroscopy: Recent advances

17:40 **K. Baberschke**
Solid State Spectroscopy from GHz to Hard X-rays: Past, Present and Future

18:20	Reception

M. Farle U. Bovensiepen H. Wende

A. Rogalev J.J. Rehr A. Scherz K. Baberschke J. Freeland Th. Rasing

Few remarks on the new CRC 1242 and my former babgroup members:

I was asked for some comments in this symposium. Well, this can take a couple of hours. Let me restrict myself to the **Cooperative Research Center 1242 and the 3 organizers for this symposium:**

I was very pleased, when I heard last summer, that your university (physics and chemistry) got a new CRC. In the past, I have been several times a member of a review committee for the former SFB Duisburg-Bochum, having discussions at that time for example with the president of the Duisburg-University.

So, I am very much interested about the new development and success. It was interesting to read the title for the different projects. It says everywhere "**Non equilibrium dynamics/spectroscopy**" or **"driven phase transitions"** etc. The word **Magnetism does not appear**. It is clear, **Uwe Bovensiepen and the CRC or other groups, like Theo Rasing, they** want to **kick the system out of equilibrium** via flash light, pressure change or electrical voltage and to study **the dynamics in time and space**. Obviously a good and promising approach.

But we also should keep in mind, there exists always a hidden parameter, the magnetism, i. e. not only the spin, but the non-spherical charge distribution of the ion. In other words, magnetism is everywhere – I will come back to this.

But unfortunately the history of magnetism went 2 different routes:

school # 1 talks only about ferromagnetism, mostly at low T. Photoelectrons are emitted with spin up and down, electronic band structure, etc. "Klaus, my magnetism starts below T_c" ,so this friend of mine misses the Curie-Weiss law. It was Jürgen Kirschner. This school #1 published in the last 20 – 30 years numerous review papers, like Heinrich & Bland. Unfortunately, many young scientists cite and study only these books and review papers.

School # 2 comes from paramagnetic ions, discusses orbital magnetic moments or non-spherical charge distribution, the ionic g-value/tensor, etc. In this group belongs for example:

Alex Müller, he studied the phase transition and local fluctuation in SrTiO3 at 105 K with magnetic resonance. And his ruby crystal works still for students in advanced labs.

Albert Fert We studied anisotropic vector-spin glasses in Rare Earth compounds using Ising and XY models. Our former student F. Bruss is present today.

Peter Grünberg, as well as Sepp Pelzl present today, we leant together solid state and atomic physics using Kittel and Hellwege books.

Fortunately the **today's groups of fs-laser or x-ray pulses** follow this second route. In other words, your SRS seems to be on the right track.

Now to the 3 organizers: **Uwe Bovensiepen**; It is clear, that I am very pleased that he became the spokesman of the CRC. That's great, that he and the whole team was successful and they got already money from the DFG since last summer. So, they could support this symposium. **Many thanks**.

Uwe studied in our group ultra-thin Ni/Cu films below and above T_C with UHV-susceptibility measurements. **Diplom in 96 and first Phys. Rev. early 97**. Shortly after, as **PhD student he had his first PRL in 98**. A very nice work, in coupled Co–Ni films, he measured **2 separate Curie temperatures.** This is not trivial – 1 or 2 phase transitions?

This paper is cited 70 time, even today. Now he has almost 100 publications and a Hirsch-factor close to 30. Even in 2000 –his PhD year – he published together with Andreas Scherz and XMCD about the Curie temperature in Ni and Co films.

There is a nice story: When he applied here for his present position in ultrafast phenomena with fs-LASER. I heard, that one member of the committee asked, "Oh, is this the same Bovensiepen, who did ultra-thin film magnetism?"

Heiko Wende: He came to our group, together with Heike, Diplom in 95 and first paper at the XAFS IX conference 96 in Grenoble. Both worked at BESSY with XAFS. This was a very productive cooperation with John Rehr. John and his students started with ab initio calculations for X-ray absorption spectroscopy, and Heiko was the key-student in our group to adapt John's calculation for our EXAFS and NEXAFS experiments.
We did single crystal work with adsorbates on the surface. So we asked the theory group step by step for more detailed calculation
Step 1, we did angular dependent measurements from grazing to normal incidence, they did the corresponding calculation.
Step 2, we measured the T-dependence , they added the Debye-Waller factor ,etc.
Finally in step 3 we used circular polarization, XMCD. And we got in most cases perfect agreement between experiment and theory, with many common publications. For Heiko also a good field for his PhD (99) and Habilitation (2004); now with almost 200 publications.

I find this coupled study in theory and experiment very instructive, reliable and productive. For your present CRC I suggest a similar procedure and I see for some of the projects that this is possible. You even have the theory already in house, Rozzitza for example. She worked years ago with us, when she was a PhD student in Berlin.

Michael Farle: This will be a long story; Michael started his university study in New Orleans. Coming back to Germany and the free University in the early 80ith, he came to one of my lectures. : "*Ergänzungen zur Festkörperphysik*" .This was a free lecture – at that time I was still optimistic to give non-obligatory lectures. But no student appeared – except Michael. So I asked him to join my group meetings. We were still working in the famous old building in Boltzmann Str., where Heisenberg, Debye, a. o. worked before.
So he knows all about the **babgroup**, the students, the new spectrometers, the new building, etc. And I know about his early girlfriend, Andrea, her first student apartment in Kreuzberg and I was invited to their wedding.

Michael and I, we had the first paper together in 1985 already on adsorbates on surfaces in UHV…2 years later **his first PRL appeared on critical exponents**. In total, we had almost 70 papers together.
He got his Diplom with ESR in UHV in 84 – a complete new technique. After his PhD in 89 he and his family spent a couple of years at Stanford University – very interesting. Then he came back to our group for Habilitation in Magnetic Resonance.
Must important is, that his Habilitation-Review paper in 98 has his maximum of citations, close to 500, cited today every year more the 10 – 30 times. Certainly, I was not a coauthor, but it is also nice for the boss of the "babgroup" to see, that the magnetic resonance is quite important. Finally, his h-factor is > 40 with more than 200 papers.

I guess, we are close to the reception.

So I wish the whole CRC 1242 good success, to study:

„Neue Materialeigenschaften, die nur im Nichtgleichgewicht existieren".

You have a good starting point, and part of it, we heard already in todays symposium.