EDGE 2009

Final Program

Sunday 17 May

15:00 Registration desk opens, Max-Bell Building, Foyer

18:00 *Welcome reception*, Max-Bell Building, Foyer and Lounge

20:00 Plenary Conference Opening Talk, Max-Bell Building, Auditorium
Professor George Sawatzky, Department of Physics, University of British Columbia, Vancouver, Canada.

Resonant Elastic Soft X-ray Scattering Applied to Transition Metal Oxides and Their Buried Interfaces

I will give a brief introduction of resonant x ray scattering, a new technique which combines the spectroscopic power of high resolution x-ray absorption spectroscopy with reflection and diffraction characteristics to obtain detailed information about the spatial (or rather momentum space) distribution of charge, spin, orbital and lattice degrees of freedom. The most modern facility for RESXS will be operational at the Canadian light source this fall. RESXS is complimentary to ELS which has the advantage of real space atomic resolution. I will concentrate on applications in transition metal oxide research with special emphasis on the very recent spectacular new properties found at the interfaces of two different oxides. Such buried interfaces are difficult to study but both ELS combined with electron microscopy and RESXS can provide detailed information concerning the electronic structure at such interfaces. In order to discuss this potentially very important new development I will give a brief introduction to the issues of polar surfaces and polar discontinuities at interfaces in ionic materials resulting in a reconstruction or the electronic structure accompanied by spectacular changes in the physical properties.

Monday 18 May, Morning Session

Christian Colliex Symposium: Valence EELS **(Chairs: O. Krivanek, V. Serin)**
Max-Bell Building, Auditorium

9:00 **Odile Stephan** (Invited), Université Paris Sud, France
Nano-optics experiments in a STEM

9:30 **Wilfried Sigle**, Max-Planck Institute for Metals Research, Germany
Surface plasmon resonance effects in Ag nanoholes studied by energy-filtering TEM

9:45 **Ming-Wen Chu**, National Taiwan University, Taiwan
Probing bright and dark surface-plasmon modes in individual and coupled Au nanoparticles using an electron beam

10:00 **Michel Bosman**, A*STAR Institute of Microelectronics, UK
Monochromated EELS on confined silicon

10:15-10:45 *Coffee Break*, Max-Bell Building, Foyer

10:45 **Ferdinand Hofer** (Invited), Graz University of Technology, Austria
High resolution imaging of surface plasmons by energy-filtering transmission electron microscopy

11:15 **Vicki Keast**, The University of Newcastle, Australia
Using electron phase shifts to detect plasmon resonances of gold nanospheres

11:30 **Luc Henrard**, University of Namur, Belgium
Low-loss simulation with a discrete dipole approximation

11:45 **Gerald Kothleitner**, Graz University of Technology, Austria
Band-gap mapping with a monochromated EF(S)TEM

12:30 *Lunch*, Dining Room

Afternoon Free (posters can be set up in Max Bell Building, Rooms 252 and 253).

Monday 18 May, Late afternoon Session

16:00 *Nutribreak*, Max Bell Building, Foyer

Ray Egerton Symposium: Elemental and ELNES 2D and 3D imaging **(Chairs: G. Botton, N. Browning)**

16:30 **Richard Leapman** (Invited), National Institute of Biomedical Imaging and Bioengineering, USA
EELS imaging of biological structures in two and three dimensions

17:00 **Lena Fitting Kourkoutis (Invited)**, Cornell University, USA
Atomic-scale chemical imaging of interdiffusion and defects in perovskite oxide heterostructures

17:15 **Alan Craven,** University of Glasgow, UK
EELS analysis of high-k dielectric systems

17:30-17:45 *Break*

17:45 **Koji Kimoto** (invited) National Institute for Materials Science, Japan
High spatial-resolution analysis using STEM-EELS and ADF; Limit of incoherent imaging approximation

18:15 **Raymond Egerton**, University of Alberta, Canada
Basic questions involved in electron-induced sputtering

18:30 **Guenter Moebus**, University of Sheffield, UK
Energy loss characterisation of nanostructures in 2D and 3D

19:00 *Dinner*, Dining Room

20:30 **Poster Session 1 and Drinks**, Max Bell Building 252, 253 and Lounge

Tuesday 19 May, Morning Session

Advances in Instrumentation and Ultimate Physical Limits **(Chairs: D. Muller, P. Nellist)**

9:00 **Max Haider** (Invited), CEOS GmbH, Germany
Resolution limits in TEM

9:30 **Peter Tiemeijer**, FEI Company, Netherlands
Improvements of TEM and holography resolution with a high-brightness FEG

9:45 **Colin Trevor**, Gatan R&D, USA
An experimental ultra fast shutter for a spectrometer

10:00 **Gerald Kothleitner**, Graz University of Technology, Austria
Accurate chemical shift measurements using a post-column spectrometer equipped with an experimental electrostatic shutter

10:15-10:45 *Coffee Break*, Max Bell Building, Foyer

10:45 **Ondrej L. Krivanek** (Invited), Nion Co, USA
Resolution limits in STEM and EELS

11:15 **Eiji Okunishi**, JEOL Ltd., Japan
Visualization of light elements at ultrahigh resolution by STEM annular bright field microscopy

11:30 **Marcel Tencé**, Université Paris-Sud, France
Towards systematic single scattering EELS analysis with improved energy resolution. A new detection scheme

11:45 **Masashi Watanabe**, Lehigh University, USA
Applications of high spatial/energy resolution energy-filtering transmission electron microscopy (HREFTEM) for phase analysis of Al alloys in the aberration-corrected, monochromated TEAM instrument

12:00 **Helmut Kohl**, Westfälische Wilhelms-Universität Münster, Germany
Determination of partial structure factors of disordered solids from elemental maps

12:30 *Lunch*, Dining Room

16:00 *Nutribreak*, Max Bell Building, Foyer

Tuesday 19 May, Late Afternoon Session

Modelling **(Chairs: M. Terauchi, R. Egerton)**

16:30 **L. J. Allen** (Invited), University of Melbourne, Australia
Atomic resolution STEM based on core-loss spectroscopy

17:00 **Vincent Mauchamp**, Poitiers CNRS, France
Core-hole effect in the one-particle approximation revisited from Density Functional Theory

17:15 **Cécile Hébert**, Ecole Polytechnique Fédérale de Lausanne, Switzerland
Calculation of the angular-dependent loss function of fcc metals using *ab-initio* methods

17:30–17:45 *Break*

17:45 J**avier García de Abajo** (Invited), Instituto de Óptica – CSIC, Spain
Optical excitations in electron microscopy

18:15 **Guillaume Radtke**, Aix Marseille III, France
On the electronic structure of $Sr_3Cr_2O_8$: a weakly-interacting S=1/2 dimer system

18:30 **Micah Prange**, University of Washington, USA
Density matrix calculations of optical constants from optical to X-ray frequencies

19:00 *Dinner*

20:30 **Poster Session 2 and Drinks**, Max-Bell Centre Rooms 252, 253 and Lounge

Wednesday 20 May, Morning session

Beyond Traditional Microscopy **(Chair: A. Bleloch)**

9:00 **Adam Hitchcock** (Invited), McMaster University, Canada
NEXAFS microscopy of soft materials – comparison to TEM-EELS

9:30 **Bryan Reed** (Invited), Lawrence Livermore National Laboratory, USA
Dynamic TEM and time-resolved electron spectroscopy

10:00 **Masami Terauchi**, Tohoku University, Japan
Angle-resolved soft-X-ray emission spectroscopy of anisotropic structure material based on transmission electron microscopy

10:15-10:45 *Coffee Break*, Max Bell Centre, Foyer

10:45 **Joanne Etheridge**, Monash University, Australia
Why and how to measure the wave field of the electron probe

11:15 **Philip E. Batson**, IBM Thomas J. Watson Research Center, USA
Plasmon driven nanoparticle movement in the electron beam

11:30–12:15 Round Table: Probe intensity (**P. Batson, A. Craven, S. Pennycook, R. Egerton, O. Krivanek**)

12:30 *Lunch*, Dining Room

Conference tour (Lake Louise). Tour will depart at 2pm in front of the Eric Harvie Theatre.

Evening Dinner in Banff (Delegates dine on their own)

Thursday 21 May, Morning Session

Applications for Materials Science and Biology, Part I **(Chairs P. Batson, J. Mayer)**

9:00 **Peter A. van Aken** (Invited), Max Planck Institute for Metals Research, Germany
Pushing the limits in monochromated EFTEM using the SESAM

9:30 **Michael Walls**, Université Paris Sud, France
Aberration-corrected STEM-EELS applied to perovskite spintronic (and some other) systems

9:45 **Maria Varela**, Oak Ridge National Laboratory, USA
Atomic resolution spectroscopic imaging of complex oxide materials

10:00-10:30 *Coffee Break*

10:30 **Philippe Moreau** (Invited), Université de Nantes, CNRS, France
Modeling and EELS experiments, application to lithium batteries

11:15 **Gianluigi Botton**, McMaster University, Canada
Bonding in perovskite structures

11:30 **Huolin L. Xin**, Cornell University, USA
Aberration-corrected STEM depth sectioning and prospects for reliable 3D imaging in aberration-corrected microscopes

11:45 **Thierry Epicier**, Université de Lyon, France
EELS evidence of 4 f electrons delocalization in nano-sized gadolinium oxide

12:30 *Lunch*, Dining Room

Thursday 21 May, Late Afternoon Session

Applications for Materials Science and Biology, Part II **(Chairs: F. Hofer, M. Varela)**

16:00 *Nutribreak*

16:30 **Peter Schattschneider** (Invited), Vienna University of Technology, Austria
Chiral EELS: Application to magnetic materials

17:00 **Bénédicte Warot-Fonrose**, CEMES-CNRS, France
Corrections on ESI data cube for energy-loss magnetic chiral dichroism: Theoretical and experimental examples

17:15 **Yasuo Ito**, Northern Illinois University / Argonne National Laboratory, USA
Magnetic linear dichroism probed by high momentum resolution EELS

17:30-17:45 *Break*

17:45 **Andrew R. Lupini** (Invited), Oak Ridge National Laboratory, USA
High resolution 300kV EELS

18:15 **Robert F. Klie**, University of Illinois at Chicago, USA
Variable-temperature EELS study of magnetic transitions in $LaCoO_3$

18:30 **Alan Craven**, University of Glasgow, UK
Why is it so difficult to analyse carbon in a ferritic steel?

18:45 **Herbert K. Schmid**, University Bonn, Germany
ELNES in transition metal oxides recorded by HR-EELS

19:30 *Conference Dinner Banquet*, Donald Cameron Hall

Friday 22 May, Morning Session

Applications for Materials Science and Biology, Part III **(Chairs: S. Pennycook, Ch. Colliex)**

9:00 **Mhairi Gass** (Invited), SuperSTEM, Daresbury Laboratory, UK
Aberration corrected STEM-EELS: Reducing the accelerating voltage for carbon nanostructures

9:30 **Kazu Suenaga**, National Institute of Advanced Industrial Science and Technology, Japan
Single atom spectroscopy by STEM-EELS with the DELTA corrector at 60kV

9:45 **Marie Cheynet**, Grenoble Université, France
New fine structures in anatase Ti-$L_{2,3}$ edge: Interpretation in the multichannel multiple scattering theory

10:00 **Weidong Luo**, Vanderbilt University, USA
Electronic and crystal-field effects in EELS fine structure of complex oxides

10:15-10:45 *Coffee Break*

10:45 **Teruyasu Mizoguchi** (Invited), The University of Tokyo, Japan
Theoretical and experimental ELNES: Application to materials science

11:15 **Sylvie Schamm**, Université de Toulouse, France
STEM-EELS investigation of elemental distributions and ELNES fingerprints in high-k dielectric gate stacks on Si and Ge

11:30 **Hanako Okuno**, CEA Grenoble, INAC/SP2M/LEMMA, France
HAADF-STEM analysis of rare-earth doped GaN quantum dots

11:45 **Rik Brydson**, University of Leeds, UK
Nanostructural development in graphitising and non-graphitising carbons probed using TEM/EELS

12:00 *Lunch and departures*