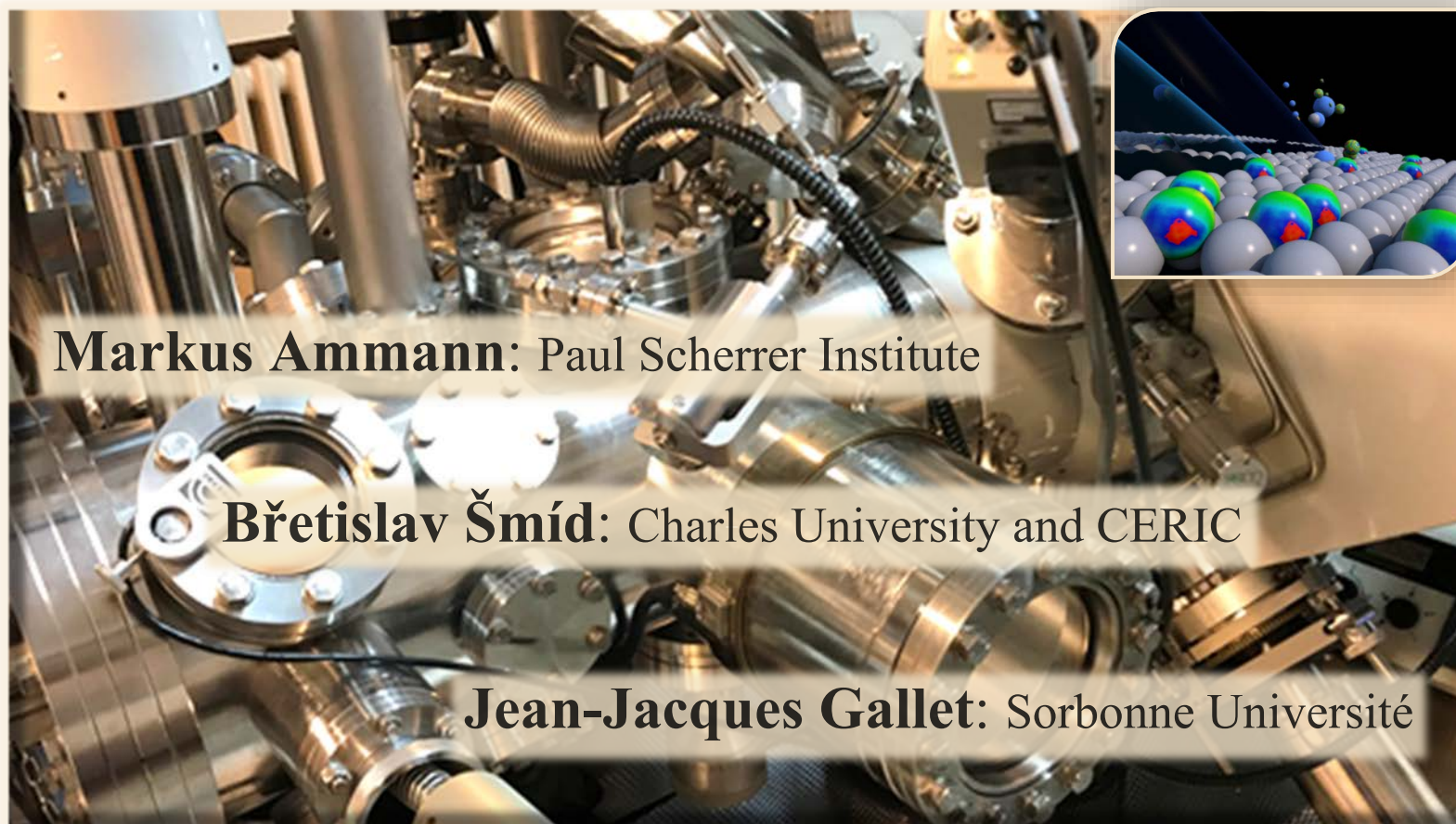


# Online series of seminar on: NAP-PES state of the art and future developments 11<sup>th</sup>, 14<sup>th</sup> and 15<sup>th</sup> of December 2020



**Markus Ammann:** Paul Scherrer Institute

**Břetislav Šmíd:** Charles University and CERIC

**Jean-Jacques Gallet:** Sorbonne Université

**Registration:** <https://evento.renater.fr/survey/register-to-the-nap-pes-state-of-the-art-and-future-developments-ha2w85xb>



# IRCELYON and Fédération de recherche (FR): spectroscopies de photoémission

Online series of seminar: *join us to learn about*

## NAP-PES state of the art and future developments

### 11<sup>th</sup> of December 2020

9:30 Welcome and introduction

9:45 **FR: Spectroscopies de Photoémission: Potential avenues for future actions**

Hervé Martinez - *IPREM, France*

10:00 **Perspective of X-ray photoelectron and electron yield absorption spectroscopies to probe environmental interfaces**

Markus Ammann – *Paul Scherrer Institute, Switzerland*

### 14<sup>th</sup> of December 2020

10:00 **Near Ambient Pressure XPS at Charles University in Prague: current status and future outlook**

Břetislav Šmíd - *Charles University, Czech Republic*

### 15<sup>th</sup> of December 2020

10:00 **“Near ambient Pressure X-Ray Photoelectron Spectroscopy” on TEMPO beamline: A new tool for surface characterization for operando studies**

Jean-Jacques Gallet – *LCPMR/UPMC, France*

11:15 **Discussions on future directions and needs**



## Perspective of X-ray photoelectron and electron yield absorption spectroscopies to probe environmental interfaces

**Prof. Dr. Markus Ammann**

*Paul Scherrer Institute*

*Forschungsstrasse 111*

*5232 Villigen PSI - Suisse*

X-ray photoelectron spectroscopy (XPS) of typically core atomic electronic levels provides chemical composition information and electron yield near edge X-ray absorption fine structure (NEXAFS) spectroscopy gives insight into the structure of the local molecular environment. The low inelastic mean free path of electrons of a few nanometer enables sensitivity for the condensed matter – gas interfacial region. The development of ambient pressure electron analyzers has offered tremendous opportunities for molecular understanding of environmentally relevant aqueous solution surfaces, ice surfaces, and mineral oxides, all in presence or absence of reactive trace gases and in or out of equilibrium with water vapor. Applications involving the characterization of interfacial structure, the protonation state of acids or the direct observation of reaction intermediates will be presented. A perspective will be given to opportunities with in situ spectroscopy on free particles and droplets and options to probe solid-liquid interfaces.

## Near Ambient Pressure XPS at Charles University in Prague: current status and future outlook

**RNDr. Břetislav Šmíd, PhD.**

*Department of Surface and Plasma Science*

*Faculty of Mathematics and Physics, Charles University*

*V Holešovičkách 2, 180 00 Prague, Czech Republic*

During my talk I will introduce the apparatus of Near Ambient Pressure XPS in Nanomaterials group at Department of Surface and Plasma Science at Charles University, and explain its advantages, drawbacks and limitations. As part of Central European Research Infrastructure Consortium (CERIC), NAP-XPS station in Prague became a great opportunity and successful tool for many scientists from all around the world. Significant results we have achieved during last three years on different studied systems from various scientific fields under operando conditions (catalysis, sensors, electrochemistry and more) will be presented. The very recent rebuilding of the NAP cell for in situ electrochemical measurements will be mentioned in the end of the talk and the future directions of operando studies will be discussed.



## “Near ambient Pressure X-Ray Photoelectron Spectroscopy” on TEMPO beamline: A new tool for surface characterization for operando studies

**Prof. Dr. Jean-Jacques Gallet**

*Laboratoire de Chimie Physique – Matière et Rayonnement*

*Paris Sorbonne Université, Faculté des Science et de l'Ingénierie*

*Chercheur associé au Synchrotron SOLEIL, Saint-Aubin, France*

X-Ray Photoemission Spectroscopy is a powerful tool for physicochemical characterization. It allows both elemental and chemical analysis, giving information on the electronic structure of surfaces and their reactivity.

Until recently, the need for ultrahigh vacuum limited the XPS study of surface reactivity to static systems, where the ex-situ reaction was characterized post-mortem, or for systems slowly evolving with time. Recent technical developments on photoelectron analyzers coupled with the latest generation of synchrotron radiation sources for rapid acquisition, offer new opportunities for studies surface reactions in operando

During this presentation, I will shortly present the experimental station Near-Ambient-Pressure XPS (NAP-XPS) of Sorbonne University set up on the TEMPO beam line of the SOLEIL synchrotron, allowing to work up to pressures of 20 mbar. I will present some examples of studies in different fields (catalysis, electrochemistry, environmental chemistry), and the latest technical developments.

