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LEAPS and the future of life sciences at large facilities

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Synchrotron radiation and free electron laser facilities are by nature large-scale multidisciplinary research infrastructures, as exemplified by LEAPS partners which offer a comprehensive and unique portfolio of instruments, methods, and techniques, to support a wide and diverse range of applications, from physics, chemistry, engineering to biology and medicine.

In this context, the Life Sciences community, notably structural biology, has always played a central role in the development of such research infrastructures. As a matter of fact, the size of this community and its scientific productivity have been at the origin of many synchrotron and FEL projects. Following the outstanding achievements of the structural biology community, many other emerging techniques, notably X-ray imaging, are also becoming key tools to underpin a more integrative approach. More complex and challenging questions, aiming at linking structural information to biological function in a cellular context and ultimately to ecosystems, require multi-modal and multi-scale research strategies which fit well with new capabilities of modern photon science infrastructures.

However, as illustrated by the dramatic development of cryo-electron microscopy and the advent of new computational methods (e.g., Alphafold), the landscape is changing very rapidly and photon source facilities need to go beyond their initial remit of provider of infrastructure for data collection and to adapt in many aspects (instrument performance, access modes, support labs, service for non-expert users, ...).

This presentation aims at laying the grounds for a general discussion on this upcoming necessary evolution in a rapidly changing context. Current trends, bottlenecks, and challenges, as well as new opportunities in the development of life sciences at synchrotron and free electron laser facilities in Europe, will be discussed and illustrated by examples.

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Session Classification: Strategy Discussion