

OVERVIEW OF SYNCHROTRON RADIATION LIGHT SOURCES

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Abstract

Third generation light sources are, at present, the most intense and stable sources of short X-ray pulses. Their successful operation has triggered several new projects, resulting in a constant growth of the user community and an expansion in experimental techniques. With the recent conceptual and technological advancements, the performance of third generation light sources has however reached its limits. Novel techniques have been developed to further the scientific endeavors. Energy Recovery Linacs (ERL) are able to overcome some of the intrinsic performance limitations of storage ring based light sources. An even higher performance can be achieved with Free Electron Lasers (FELs) based either on storage rings, ERLs or linear accelerators. X-ray FELs based on Linacs represent the next generation of sources of intense X-ray pulses. The dramatic increase in flux and time resolution brought about by X-FELs will not only represent another breakthrough in technical achievement, but will provide a new frontier in which great scientific discoveries can be envisaged. The evolution of light sources will be presented with emphasis on the conceptual and technical innovations.

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