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Synchronization in plasma accelerators

Tuesday, 8 April 2025 14:00 (1 hour)

This presentation provides an overview of synchronization systems for plasma accelerators, focusing on the critical role of phase stability in ensuring the successful operation of these advanced facilities. We begin with an introduction to the fundamentals of phase noise in oscillators, including its sources and methods of measurement, which are essential for understanding the challenges faced in advanced accelerator facilities. The core of the presentation describes the main building blocks of synchronization systems, with examples drawn from current state-of-the-art, highlighting the latest advancements and their practical implementations. Finally, we review accelerator facilities worldwide, showcasing those with the highest performance in terms of synchronization, while also discussing the challenges that future plasma accelerators will pose to synchronization systems. This presentation aims to offer insights into the evolving landscape of synchronization technologies and their pivotal role in the development of next-generation plasma accelerators.

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