

Overview of Structure Wakefield Acceleration at Argonne National Laboratory

Thursday, November 14, 2024 9:50 AM (30 minutes)

Structure Wakefield Acceleration (SWFA) is a leading candidate among advanced acceleration concepts (AACs), offering a promising solution to overcome the limitations of traditional radiofrequency (RF) accelerators. By utilizing ultra-short microwave pulses (~10 ns) to drive advanced accelerating structures, SWFA aims to significantly increase accelerating gradients and enhance energy efficiency.

Research has focused on four principal technologies: the drive beam, main beam, wakefield structure, and facility design. Two SWFA schemes are currently being developed: the collinear wakefield accelerator (CWA), where the drive and main beams share the same path through the structure, and the two-beam accelerator (TBA), where the beams travel through separate structures.

Looking ahead, key research areas include the development of specialized wakefield structures, exploration of terahertz and sub-terahertz (THz) frequencies, and the study of RF breakdown physics. These efforts will help pave the way for large-scale applications, such as AAC-based compact light sources and linear colliders.

Paper submission Plan

No

Best Presentation

No

Contribution track

ICABU WG1. Accelerator Systems

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Session Classification: ICABU WG1

Track Classification: ICABU: ICABU WG1. Accelerator Systems