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Advanced RF Structures for Wakefield Acceleration and High-Gradient Research

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Structure wakefield acceleration (SWFA) is one of the most promising AAC schemes in several recent strategic reports, including DOE's 2016 AAC Roadmap, report on the Advanced and Novel Accelerators for High Energy Physics Roadmap (ANAR), and report on Accelerator and Beam Physics Research Goals and Opportunities. SWFA aims to raise the gradient beyond the limits of conventional radiofrequency (RF) accelerator technology, and thus the RF to beam energy efficiency, by reducing RF breakdowns from confining the microwave energy in a short (on the order of about 10 ns) and intense pulse excited by a drive beam. We envision that the following research topics, within the scope of AF7, are of great interest in the next decade: advanced wakefield structures, terahertz and sub-terahertz (THz) structures, and RF breakdown physics. Research on SWFA in the above directions would directly contribute to long-term large-scale applications, including AAC-based linear colliders and compact light sources. There is also potentially a strong synergy between SWFA and other AAC concepts, when structures are combined with plasmas into hybrid AAC schemes. Research on novel structures is at the core of advancing SWFA, and is critical to future AAC-based linear colliders; at the same, it has a strong synergy with other directions, such as cavity designs, high-power microwave systems and sources, and compact light sources.

In-person or Virtual?

In-person

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