
# About the cover: *Advanced Photonics Nexus* Volume 2, Issue 3

High-gain free-electron lasers (FELs) have the potential to revolutionize research in various scientific fields, due to their exceptional brightness and tunable wavelength radiation pulses. Seeded FELs, inheriting characteristics from external lasers, provide more stable and fully coherent FEL pulses. However, generating ultraviolet seed lasers at MHz-level repetition rates, crucial for effective FEL energy modulation, remains a considerable challenge with current state-of-the-art laser systems.

Researchers at the Shanghai Advanced Research Institute and the Shanghai Institute of Applied Physics have developed a groundbreaking technique for self-modulation, which holds promise to reduce the peak power requirements of seed lasers by more than two orders of magnitude. In this work, "High-repetition-rate seeded free-electron laser enhanced by self-modulation," authors Hanxiang Yang, Jiawei Yan, and Haixiao Deng report the experimental realization of successfully generating coherent signals up to the 12th harmonic using harmonic self-modulation for the first time.

The development of this technique sets the stage for the realization of high-repetition-rate and fully coherent free-electron lasers, which have vast applications in multidimensional coherent spectroscopy. It also offers new possibilities for FEL schemes requiring high-power laser systems. The image on the cover for *Advanced Photonics Nexus* Volume 2 Issue 3 provides a visual rendering of harmonic self-modulation.