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**Advanced Accelerator and Laser R&D at Brookhaven's Accelerator Test Facility** MARK PALMER, MARCUS BABZIEN, CHRISTIAN CULLEN, MIKHAIL FEDURIN, Brookhaven National Laboratory, PRABHJOT KAUR, State University of New York - Stony Brook, ROTEM KUPFER, KARL KUSCHE, ROBERT MALONE, MARC MONTEMAGNO, IGOR POGORELSKY, MIKHAIL POLYANSKIY, Brookhaven National Laboratory, NAVID VAFAEI-NAJAFABADI, State University of New York - Stony Brook — The Accelerator Test Facility (ATF) at Brookhaven National Laboratory is a US DOE Office of Science User Facility that supports DOE's Accelerator Stewardship Program. The facility provides a unique combination of high brightness 70 MeV electron beams, long-wave infrared (LWIR) laser capabilities using its multi-terawatt CO2 laser, multiple near-infrared (NIR) experimental systems, and an ultrafast electron diffraction capability. We describe the current research program at the facility, in particular those activities that have been supported by recent advances in the production of high peak power LWIR pulses. We also describe our plans for the evolution of the facility to support a broad range of user research in accelerator and laser science.

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