

in the accelerator to guide and focus the electron beam as it is accelerated to high velocities. Instead, ATA researchers have developed what they call the Antigone concept. A low pressure gas is introduced into the accelerator vacuum chamber and a small, pulsed laser is used to generate a thin, cylindrical plasma in this gas. The plasma both guides and focuses the electron beam through the accelerator. The same principle has also been demonstrated for propagation of the REB through the atmosphere. Thus the Livermore FEL could do double duty. First as a laser to intercept missiles in their boost phase. Then as a particle beam weapon in which the REB is directed onto warheads as they approach the United States.

The Livermore ATA will be used to demonstrate high-power FEL operation at infrared wavelengths within the coming year. The next stage will then be the construction of a prototype beam weapon. The same general technology can, with some modifications, be used to build laser fusion power plants.

The Los Alamos FEL

As announced at Rochester, the Los Alamos FEL has also demonstrated high power lasing—upwards of 10 million watts—at the microwave wavelength. Plans for construction of an even more powerful FEL capable of being tuned to infrared wavelengths were presented at the conference. The stage following this would be the construction of a prototype space-based weapon.

The Los Alamos FEL is not dependent on a conventional laser input and can thus be “tuned” to a wide range of frequencies. It also has intrinsically higher potential efficiencies. These are the prerequisites for revolutionizing current industrial technology. Presently, the primary form of energy used in industry is heat—fundamentally incoherent infrared radiation. The Los Alamos FEL will provide the means for accessing efficiently the entire range of the electromagnetic spectrum—at least that of x-rays to radio waves—coherently and at high power densities.

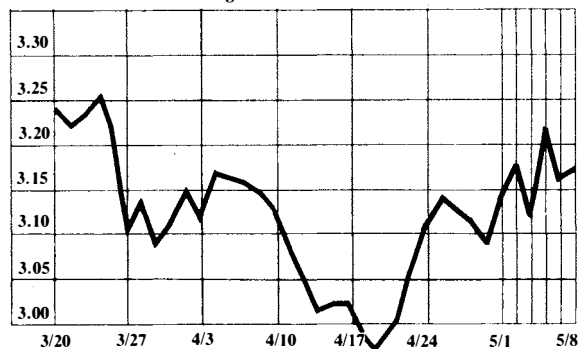
Most significantly, though, these FEL advances demonstrate that humanity is on the verge of perfecting a laser which has the potential of mastering the entire known electromagnetic spectrum. This universal laser will not only provide an efficient and effective means of defense, but will also revolutionize science and industry. The reason is that the FEL has the potential of being both tunable and highly efficient.

Industrial productivities will be increased many thousand-fold. The reason is that ordinary production-line operatives will be able to access materials on an atomic and subatomic scale. The operative will actually engineer the very molecules of the desired product output. At present this form of molecular engineering is only approximated in the electronics industry. The FEL will provide the high powers, versatility, and efficiency to extend molecular engineering to all forms of industrial practice.

Currency Rates

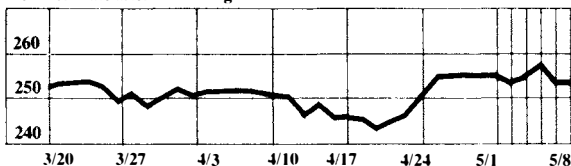
The dollar in deutschemarks

New York late afternoon fixing



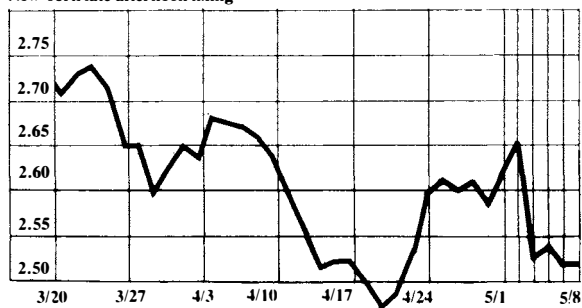
The dollar in yen

New York late afternoon fixing



The dollar in Swiss francs

New York late afternoon fixing



The British pound in dollars

New York late afternoon fixing

