

mental concepts underlie the feasibility for a strategic defense based on directed energy? Lyndon H. LaRouche, Jr. has emphasized on numerous occasions that the feasibility of the SDI does not rest on any one or group of technologies, but rather on the proven coherence of action in the universe as a whole, and on the ability to transform the laws of the universe that is characteristic of the relativistic physics that underlies directed energy weapons. As LaRouche wrote in a 1982 essay, "The Cultural Determinants of an Anti-missile Beam Weapons Policy":

The general technology under which a spectrum of many kinds of beam-weapons is subsumed is what appears to most at first to be a specialized aspect of physics, relativistic physics. Actually, if we trace out the history of modern science, from its roots in the grounding-work of Leonardo da Vinci nearly five centuries ago, we are obliged to recognize that all the fundamental accomplishments of modern science are rooted directly in the conceptions of relativistic physics already understood in broad principle by da Vinci. If we study closely, as we have been elaborating this in recent times, the functional interdependency between da Vinci's discovery of hydrodynamics and his work in relativistic geometry of visible space, something very important begins to become clear to us.

Insofar as science and technology have been more or less limited to the mechanical or mechanistic aspect of physical processes, scientists and engineers, for example, have been able to manifest competence while relying upon the defective mathematical apparatus associated with Descartes, Newton, Cauchy, Maxwell, Helmholtz, and so forth. In relativistic physics, such reliance upon the so-called analytical or inductive method is not permissible. We are obliged to prefer the kind of physics typified by the work of Bernhard Riemann, and by such predecessors of Riemann as Gauss, Legendre, Carnot, Monge, Euler, Leibniz, Desargues, Kepler, and da Vinci. . . .

The geometrical view of the universe, is typified by da Vinci, Kepler, Leibniz, and Riemann, who were explicit on this connection. The universe is proven to be not a "Big Bang" creation of a mechanical manifold. The universe is proven to be an endless process of continuing creation. In this universe lawfulness lies not primarily in fixed, mechanical sorts of laws, but rather in the consistency of certain higher principles which govern the way the universe is transformed from one entire general state to a higher state.

Only atheists who curse God's creation and would condemn mankind to eternal nuclear terror and Russian domination, would question this, as do ultimately the APS report's authors and other running dogs for Yevgenii Velikhov and the Soviet Academy of Sciences.

## The SDIO's reply

*Excerpts from the "Strategic Defense Initiative Organization Comments on the American Physical Society report on Directed Energy Technology":*

Although the chapters in the report prepared by individual panels represent an objective independent appraisal of various technologies, we find the conclusions to be subjective and unduly pessimistic about our capability to bring to fruition the specific technologies needed for a full-scale development decision in the 1990s.

The report has the additional problem of being a "snapshot-in-time" that dates to the preparation of the report. We have made significant progress in the intervening period. In fact, some technologies have shown several orders-of-magnitude increase in performance. . . . [W]e would not have made several of the assumptions that they made in defining the technical requirements.

Specific examples:

1. With respect to the free electron laser (FEL), the report states that "scaling to short wavelengths at high powers is more difficult problem than simply increasing average power." During the period over which the report was being prepared,

- [W]e have operated our FEL in the visible light spectrum.

- Scaled the FEL down in wavelength by a factor of 800 (almost three orders of magnitude).

- Improved the brightness of the electron beam injector for the FEL by two orders of magnitude.

2. With respect to the neutral particle beam (NPB) program, the report states that "NPB accelerators . . . must be scaled up to two orders of magnitude in voltage and duty cycle," and further, "ion sources . . . have not been reported to operate continuously."

- In fact, we have demonstrated a continuous wave ion source that produces 50% more current than required and has already met our beam quality goals.

- A demonstration on the 5 Mev (Million Electron Volt) accelerator test stand at Los Alamos National Laboratory that the full beam current can be produced and accelerated with no significant emittance growth.

- The remaining issue of scaling up from 5 Mev to higher energies is now a modest extrapolation of beam accelerator technology.