commentary: pier oddone



Bosons and grocery bags

In a March 1 Op-Ed piece in the *New London Day*, former Connecticut Congressman Bob Simmons raised concerns about provisions of the American Recovery and Reinvestment Act, the so-called stimulus bill.

"How did Congress conclude," Mr. Simmons asked, "that spending hundreds of billions of our tax dollars on thousands of pet projects will stimulate our consumer economy? How much stimulus will result from funding a small group of physicists working at the Fermi National Accelerator Laboratory outside Chicago? They are racing to find evidence of a hypothetical particle called the Higgs boson before a competing team in Switzerland does—if they get some 'stimulus' money...Can we buy another bag of groceries, pay the mortgage or reduce accumulating bills if a handful of scientists in Chicago are able to prove the existence of something no one has ever seen?"

It would be tempting to dismiss Mr. Simmons's concerns. Like most of our fellow citizens, he may not have had the opportunity to trace the connection between basic science and our global economic competitiveness. After all, quarks and leptons don't bring to mind immediate technological breakthroughs and consumer products, even though they are the fundamental blocks that build everything around us. And most people, even when they come into contact with accelerators such as those used in medical applications, don't necessarily recognize them as by-products of the particle physics research that studies nature at a fundamental level. So when questions arise about how the Higgs boson connects to buying another bag of groceries, we need to pay attention, because our fellow tax-paying citizens are the ones who pay the bills for US particle physics. They have a right to know what they are getting.

Because the connection between particles and payrolls is not obvious to most Americans, we have a special responsibility to demonstrate how high-energy physics research does help fill grocery bags and pay mortgages, not just by providing short-term relief in a time of economic crisis but by creating the scientific infrastructure that will lead to long-term economic strength.

We should do this in several ways. We can show how the Recovery Act funding that we invest in scientific infrastructure at our laboratories and universities creates immediate jobs for engineers, construction workers, and others in our communities. We can show how it affects the bottom lines-and the payrolls-of hightechnology manufacturing firms that build the components for our experiments. We need to be transparent in accounting for the ways we use the funding we receive, and we need to tell the human story of the people who benefit. We can also describe the educational and research opportunities that these investments create, awakening our youngsters' interest in pursuing scientific and technical careers.

We can also strengthen the effort, in partnership with the Department of Energy's Office of High Energy Physics, to go beyond anecdotal evidence and systematically characterize and document the long-term economic benefits of high-energy physics research. The transformative contributions of particle physics to medicine, industry, and communication are a much-too-wellkept secret. We need to communicate better. A DOE-sponsored conference later this year will focus attention on the tangible economic benefits of accelerator-based physics research, both historically and in the future. Through this and other efforts we must demonstrate to our fellow citizens that investing in particles means investing in the strength of our scientific enterprise and the strength, competitiveness, and well-being of our nation.

Pier Oddone is director of the Department of Energy's Fermi National Accelerator Laboratory.