

HEART OF THE MATTER

For nearly two generations the twin images of billowing mushroom clouds and fierce, life-shredding firestorms haunted the imaginations of anyone willing to believe the Cold War could abruptly flash to incandescence. The power of the atom had been unleashed and no planetary thing, animate or inanimate, was safe.

Roughly 50 years passed. Despite its association with weapons of mass destruction, physics remained in a kind of golden age. Flush with Cold War money funneled to basic and applied research, physicists were called upon to handle everything from geopolitical defense to rocket science. The investment paid off in an array of products that either were used by or to benefit taxpayers: medical and industrial lasers, microwave ovens, energy-efficient refrigerators, personal computers and compact and digital video discs. So what if dreams of clean, meterless nuclear energy and fleets of atomic cars, planes and spacecraft didn't quite pan out? Physics had done its job well and nobly.

As the millennium closes, physics finds that it must fight for resources in an era of perceived diminished risk of world war and of tight money. Increasingly, physics must explain itself. Why is it important to know more about the atom and its structure? The articles that follow offer perspective. They demonstrate that from the very smallest of things — from particles so minuscule that detecting their presence is a major technological feat — can come large, unexpected surprise. In physics, in our era, one war may be over but the frontiers remain: remote, strange, exciting, awaiting a more complete cartography.

