

PHYSICS

# Atomic Research

Nobelists describe their work in exploring the powerful nuclear forces and other fundamental questions of atomic physics.

By DR. ISIDOR I. RABI

Columbia University  
Nobelist in Physics, 1944

➤ JUST AS a century ago we were studying electrical and magnetic forces which culminated in great electrical and electronic industries, but could not foretell that fact with certainty, now these immensely more powerful nuclear forces may be turned to the advantage of mankind.

My work was directed toward investigating the magnetic and electric properties of the atomic nucleus. The purpose was to gain further knowledge of the nature of the forces that hold the nucleus together and contribute to atomic energy. In the course of these investigations my colleagues and I developed the "molecular beam magnetic resonance methods" which employed the effect of radio waves on beams of atoms and molecules. This method was a million times more sensitive than anything (*Turn to page 340*)

By DR. OTTO STERN

Carnegie Institute of Technology  
Nobelist in Physics, 1943

➤ FINDING that the magnetic moment of the proton was two and one-half times the value expected from the theory is fundamentally important because of the character of the proton as an elementary particle.

The molecular-ray method is much more sensitive than any other known methods for the determination of magnetic moments of atoms or molecules.

The method of molecular rays consists in preparing a stream of molecules by means of a system of fine slits. All molecules travel in the same direction in a highly evacuated apparatus.

Experiments with these molecular rays contribute to the solution of fundamental questions in atomic physics. Three examples may be mentioned: direct experimental proof for the space quantization of atoms by splitting a molecular ray of silver atoms in two beams in a

magnetic field; experimental proof of de Broglie's theory that moving particles show wave properties by diffracting a molecular ray of helium or hydrogen molecules at a crystal lattice, and measurement of the magnetic moment of the proton by magnetic deflection of a beam of hydrogen molecules.

*Science News Letter, November 25, 1944*

CHEMISTRY

## New Household Fly Spray To Be Available After War

➤ AN ODORLESS, nonirritating household fly spray for postwar use in homes and restaurants has been developed by W. F. Barthel, H. L. Haller and F. B. LaForge, chemists of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

Used in the aerosol "bomb" developed by the Department of Agriculture for use by the armed forces against mosquitoes, the new fly spray promises to be an effective postwar weapon against flies, roaches, bedbugs, ants, mosquitoes, house spiders, silverfish, chiggers, carpet beetle larvae, dog ticks and dog fleas. It will be suitable for use in homes, restaurants, airplanes and any place where people congregate.

The spray is made from the powerful insect-killer, pyrethrum, purified by a new method to eliminate the odor and the irritating impurities which in the past have been the cause of irritating rashes or hay fever symptoms in some pyrethrum spray users. The method involves the use of a new solvent, nitromethane, for removing practically pure pyrethrins from the impure petroleum extract of pyrethrum flowers.

The new process produces not only a much more concentrated and powerful insect poison but one in a form called "ideal" for use in the Freon-aerosol bomb. This bomb or aerosol sprayer is a small handy can dispenser that holds a liquefied gas such as Freon which is now used in household refrigerators. When a valve is opened this aerosol dispenser emits a foglike spray of poisonous droplets so tiny that they kill more insects than ordinary coarse sprays.

While not yet available for civilian sale, Agriculture Department officials state, more than 13 million of these Freon-aerosol "bombs" have been supplied to the armed forces for use against disease-carrying insects. As a result of such extensive use, this kind of aerosol spray dispenser has been thoroughly tested.

*Science News Letter, November 25, 1944*



**NOBELISTS IN PHYSICS**—Dr. Otto Stern (left), was awarded the 1943 Nobel prize in physics and Dr. Isidor I. Rabi received the 1944 award, both for atomic research.