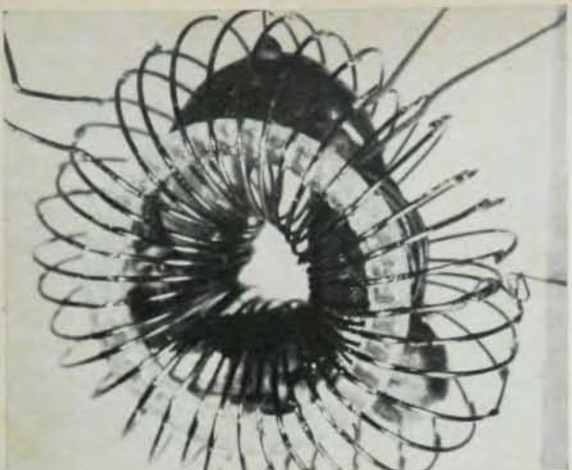

Fig. 3. Furth-Rosenbluth device with toroidal and tuning coils

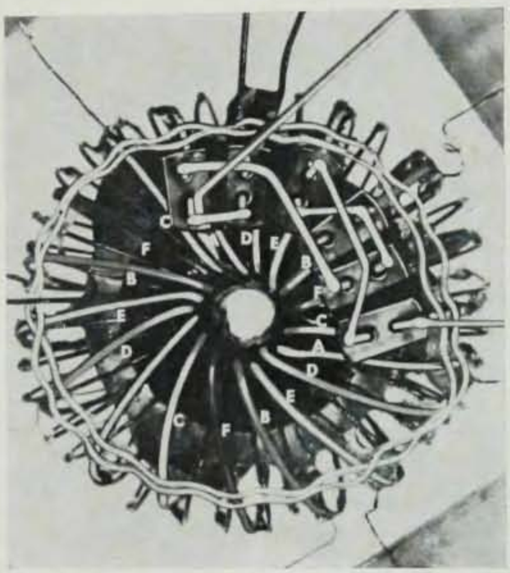

Fig. 4. Completed Furth-Rosenbluth device; a helical coil has been added to produce a magnetic field which varies as a cosine

of indium antimonide cut into the shape of a serpent swallowing its tail and fitted with a central tuning coil. In Fig. 3 a toroidal coil has been added, analogous to the axial magnetic field in open-ended systems; it serves to cut down diffusion away from the serpent's axis. Finally, Fig. 4 shows the completed machine, in which a helical coil has been added; this helical field varies as a cosine along the cross section of the plasma. Dr. Ancker-Johnson found that no combination of fields produced improvement in the lifetime of the plasma.

Considerable interest has been aroused by these thermonuclear simulation experiments and other groups are doing them now. New ideas can be tried rapidly and cheaply and in some cases might possibly provide occasional important clues, perhaps even quick tests of theory. It's true that the plasma densities and temperatures in the solid-state devices are not at all similar to those in fusion devices. The solid-state plasmas generally have higher densities (up to about 10^{18} electrons per cm^3) and considerably lower temperatures (the exact value is not known). However, the real question is: do electron-hole plasmas develop analogous instabilitites to fusion-type plasmas, and do they respond similarly to confining attempts?

NASA invites space experiments

Have you any space-flight experiments? The National Aeronautics and Space Administration is seeking proposals for its Lunar Orbiter, Surveyor, Voyager, Orbiting Solar Observatory, Advanced Orbiting Solar Observatory, Tiros, Nimbus, Explorers, and Isis, a joint US–Canadian satellite. Details are in a 107-page publication, "Opportunities for Participation in Space Flight Investigations," available for 60 cents from the Superintendent of Documents, US Government Printing Office, Washington, D. C. 20402

ORNL transuranium program

Two new facilities at the Oak Ridge National Laboratory will soon be producing grams and milligrams of transuranium elements each year. In other words, their annual production will be tens of thousands of times the quantities that have ever been made in the past. The high flux isotope reactor, which first went critical near the end of August, will, when it reaches full power, produce a thermal-neutron flux of 5×10^{15} n/cm^2/sec. This is about eight times the most intense thermal fluxes available anywhere at present. ORNL's transuranium processing facility, scheduled for completion later this year, will provide spaces and equipment for making and separating targets that are irradiated in the reactor.

Most material produced will be used in studies of nuclear structure, spontaneous fission, decay processes, chemical and biological properties of matter, and heavy-element behavior. Moreover they may hold clues to star formation. Do neutron fluxes in space form heavy elements like californium? Studying californium on earth may tell.

The new reactor has a wastebasket-size core, fully enriched uranium fuel in aluminum cermet plates, 100 MW maximal power, and light-water cooling and moderation. A 5-in-diameter center hole permits irradiation of targets where flux is at a maximum.

The processing facility is a two-story building containing nine process cells, eight laboratories and lots of remote handling and processing equipment. In it irradiated pellets for the reactor will be put together and taken apart again. The first ones that go in will contain plutonium-242 made at Savannah River. After 12 to 18 months irradiation the pellets will be processed for removal of curium (atomic number 96), which will be made into new pellets for the next irradiation cycle. After many cycles