European physicists discuss the "great projects"

A SELECT group of European physicists met in Rome last week to learn of Europe's plans for future "very large capital projects" in astroscience, subnuclear physics, synchrotron radiation and nuclear fusion—projects which, the organisers say, could dominate research and development until the end of the century. They were there by invitation of the European Physical Society, whose president, Antonino Zichichi, had decided that the meeting was needed to inform key physicists with an interest in any one of the projects of the plans for the others. All the projects are likely to compete, at least to some extent, for future funds.

Professor L. Woltjer of the European Southern Observatory (ESO) headquarters in Geneva, told the meeting that after the present generation of ground-based single dish telescopes of diameter 3-6m, the future of Europe's optical astronomy will rest with the joint NASA/ESA Space Telescope, due for launch from the Space Shuttle in 1984, and a ground-based Very Large Telescope (VLT).

So far the latter is only an idea but it is being considered seriously by the ESO The current plan is that it would have a diameter of about 16m, would probably be sited at the ESO's site in Chile and would become operational in 1990: its cost is estimated at about $100 million. As it is unlikely that a single dish of 16m diameter could be built, the VLT would probably be a multi-mirror telescope.

The Space Telescope and the VLT will be complementary, according to Professor Woltjer. The former will be used for gathering data on very faint sources which could never be observed by a ground-based telescope because of the masking effect of the Earth's atmosphere. However, because it is relatively small (2.4m diameter), the Space Telescope will be limited in the number of photons it can collect. The VLT with its large collecting area, will be capable of collecting many more photons and will therefore be suitable for detailed spectroscopic analysis of relatively bright sources.

In radio astronomy, Europe is already active in very long base interferometry (VLBI), the aim of which is to produce a two-dimensional map of radio sources. There are plans to extend the VLBI network by building more receivers and also by using one of the European Space Agency's future communications satellites as a reference point for phase and amplitude information. The French are looking at the possibility of using VLBI at optical wavelengths. A major problem however, is that the engineering tolerances of the receivers have to be very high because of the small wavelength.

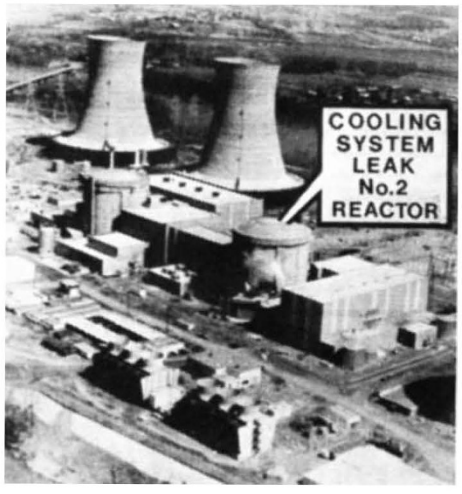
Fusion scientists are also planning their next move. According to Professor Palumbo from Brussels, an international team met last January to start discussing the machine to follow the Joint European Torus (JET) which is just getting underway at the Culhan Laboratory in the UK. Just the week before the meeting, he said, the EEC had increased the budget for European fusion research by 20 million accounting units.

Two plans for major future particle accelerators were discussed. One is Europe's plan to build a large electron-positron storage ring (LEP) (see *Nature* 12 October 1978, page 469 and 14 December 1978, page 658), the other is the Soviet Union's plan to build a 3 TeV proton synchrotron. Work on the latter has been going on for "a long time" according to Professor Siderov of Novosibirsk who presented the project instead of Professor K. P. Myznikov of Moscow who did not attend the meeting. He could not say when the machine would be built or how much it would cost, but seemed confident that it would be built at some time. Professor M. Vivargent of CERN said that the design for LEP currently favoured would cost about SwFr 1000 million and should be built by 1988. More should be known at the end of this year, however, when the report of the latest study group would be ready.

Like LEP, the European Synchrotron Radiation Facility (ESRF), is also awaiting the publication of a report at the end of this year which should also lay down the type of machine the physicists would like. It will then be up to the politicians to decide whether or not that is economically feasible. **Judy Redfearn**

Harrisburg leak 'the worst accident in nuclear history'

THE type of human and mechanical failure which occurred in the nuclear power plant near Harrisburg, Pennsylvania last week and led to the discharge of a cloud of radioactive gas into the surrounding environment, has a 50 : 50 chance of happening in 400 reactor years, according to Dr Chauncey Starr, Vice-President of the US Electrical Power Research Institute. Speaking at a press conference earlier this week, Dr Starr said that "on the technical side this accident, while no-one wanted it, has a statistical probability that falls within the predicted probability of this type of incident. We have had 400 reactor years of operation of nuclear power and the earliest statistical analyses indicated that low level releases of radiation due to equipment failure would have this kind of statistical probability".



The accident resulted from an overheating of the core of the reactor causing some damage to the fuel rods. The emergency cooling system had flooded the core with water, but the contaminated water, some of which escaped through the roof of the plant as steam, was largely responsible for the escape of fission products such as xenon, krypton and iodine into the local environment.

A critical problem still to be resolved is a 1,000 cubic ft hydrogen bubble trapped in the reactor core. Efforts to redissolve the bubble have failed and the radiation levels inside the plant are too high to release the pressure manually.

After a second release last Saturday a reading of 1,200 mrem per hour was taken at the gas vent, 25 mrem per hour south of the plant site and 15 mrem per hour within a five mile radius. Street and doorstep measurements in Harrisburg ranged from 2 to 5 mrem per hour. A normal chest X-ray produces 30 mrem of ionising radiation. Thus the inhabitants of Harrisburg, 10 miles from the plant are receiving the equivalent of from one to five chest X-rays per day with plant officials predicting several more days of radiation leaks. The possibility still remains that 600,000 people in a 20-mile radius around the plant may have to be evacuated. □

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