High-energy physics

Researchers face risk of neutron shortage

THE European neutron beam community is facing a lean time. With applications for "beam-hours" 2½ times the number available last year, the principal neutron source in Europe at the Institut Laue Langevin (ILL) in Grenoble is now off the air for three months, and will shut down for major repairs for at least a year beginning in August 1984. The result will be a major hiatus in neutron research programmes: although ILL officially involves only three countries (Britain, France and West Germany) the 300–400 British neutron researchers alone run around 1,000 experiments a year there, and groups from other countries join in collaborations.

In the face of this "neutron shortage", research groups are seeking neutron time elsewhere, mainly at Brookhaven, Oak Ridge and Los Alamos in the United States, where the facilities are intended largely for local users. According to one British neutron user, only "entrepreneurial types" and those with good American connections are likely to find many neutrons in 1984–85.

There are two European lights on the horizon, however. Britain's Spallation Neutron Source (SNS), under construction at the Rutherford and Appleton Laboratory in Oxfordshire and the French reactor Orphée. SNS will use an intense proton source to bombard a uranium target, producing many orders of magnitude more neutrons than ILL at high energies, a few fewer at intermediate (epithermal) energies and about the same number of low energy (cold) neutrons. Orphée is a thermal reactor, like ILL, but of about a third the power. The reactor has had teething troubles, but is just about to begin serious operation.

In Britain, SNS engineers have just demonstrated the linear injector, which accelerates hydrogen ions to 70 MeV, and the cyclotron sections, which will take protons to first 550 MeV, and later 800 MeV. This should be giving beam (and thus neutrons) by mid-1984, just before ILL's shutdown. However, the initial neutron intensity will be low, around one-tenth of the maximum, and it will take two years to wind up the intensity fully. This is because the proton beam is of very high intensity, and any slight mistuning of the accelerator could cause the beam to irradiate internal components to intolerably high levels. Thus intensity can be increased only as tuning improves over a couple of years.

Moreover, SNS will at the outset be short of funds — ILL has been a success primarily because it began with a full complement of high quality instruments (spectrometers and so on). SNS has room for 25 instruments, operating on 18 beam lines, but it will begin with only six, with a possible seventh coming from India, where the Bhabha Atomic Research Centre has signed the only international agreement so far to work with Britain on SNS. Negotiations are also in progress with West Germany and Italy.

Moreover, at the Science and Engineering Research Council, which pays for SNS, there is a feeling that too much is being spent on neutron research.

Meanwhile, at 10-year-old ILL there are two problems: beam tubes have become embrittled through neutron exposure, and must be replaced; and a large, internal hole in a baffle plate in the reactor cooling circuit must be replaced. The French nuclear safety committee (SCIN) is considering how long ILL can continue without repairing the hole. By May this year, ILL staff hope to be given a "driving licence" to continue running with the hole unrepaired until autumn 1984. Then the repair has to be made. If it can be done through the top of the reactor, a year should be enough; if not, and the reactor has to be completely dissassembled, it could be longer. **Robert Walgate**

Polish science

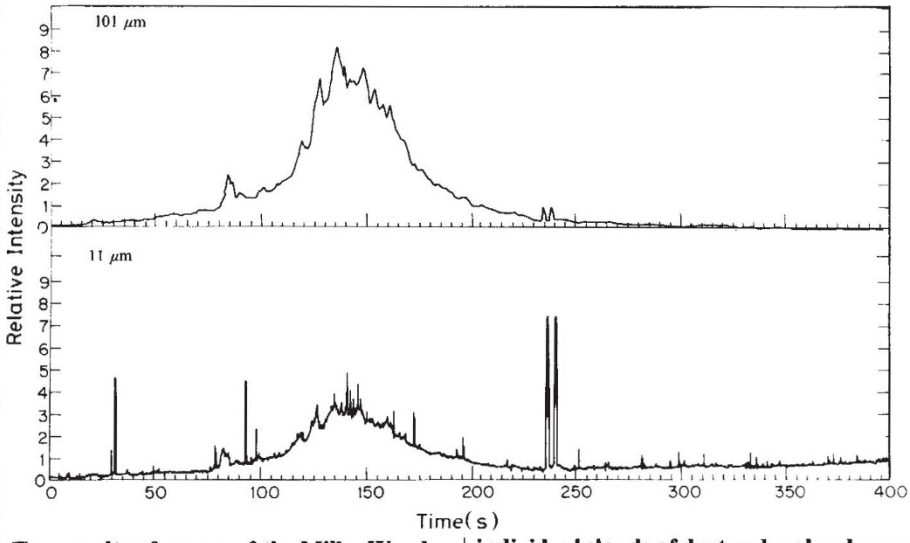
Talk of change

RESPONSIBILITY in Poland for applied science and its industrial applications should be transferred from the Academy of Sciences and the universities to a new state body at ministerial level, according to Dr Zdzislaw Kaczmarek, chief academic secretary of the academy. Last month, Dr Kaczmarek told the plenary meeting of the academy that the universities and the academy should retain responsibility only for basic research and that the new body should be responsible for all industry-related research.

Such a policy would represent a total reversal of Polish science planning over the past ten years. Until 1972, Poland followed the usual Comecon model of having a "Committee of Science and Technology" at ministerial level. In that year, however, it was decided that, with 75 per cent of the research potential concentrated in the universities, the committee should be absorbed into a new Ministry of Science, Higher Education and Technology.

In 1977, at the Jablonna conference on science policy, the then academic secretary of the Polish Academy of Sciences, Dr Jan Kaczmarek (no relation), explained that the main advantage of the combined ministry was that it could increase

IRAS scans the Southern Cross



THE results of a scan of the Milky Way by the telescope of the Infrared Astronomy Satellite, launched on 26 January (see *Nature* 27 January, p.275). These data were obtained an hour after the protective cover of the telescope was removed. The scan covered 25 degrees of arc at 45° across the plane of our Galaxy in the constellation Crux, the Southern Cross.

The upper tracing is dominated by 100 μm wavelength emission from cold dust associated with the material out of which all stars in the Galaxy are formed. The central bulge extends approximately 10°. The structure in the tracing is due to individual clouds of dust and molecular gas hundreds of light years across. (The two spikes on the right side of the central peak are from an internal calibration source within the telescope and indicate the relative scales of the two graphs.)

The bottom tracing shows the intensity at a wavelength of 10 μm and is mainly due to emission from thousands of millions of stars. The bulge at the centre shows the densest concentration of stars; the slow increase to the right of the scan is caused by warm dust in the plane of the Solar System. The individual narrow spikes are caused by single bright or nearby stars.

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