ARCHIVE EDITION OF IRPS BULLETIN

Volume 10 No 4 December, 1996/January 1997

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Main

From the Editor

Dudley Creagh

Let us hope that 1997 is a year which brings peace, prosperity and happiness to all the people of the world

This is the first of the IRPS Bulletins to be available on the World Wide Web. The aim is to increase the accessibility of information on the IRPS to people, thereby increasing wawareness of its aims and aspirations in the general scientific community. Access to the home page is through:

http://beth.canberra.edu.au/IRPS/welcome.html

The home-page and the Bulletin, which are the windows to the world of the IRPS, depend on you, the members, to illuminate and decorate

Without copy, an editor cannot produce a Bulletin of any stature. Nor can we fulfil the requirement of keeping our members informed about happenings in the many countries to which our members belong unless members send in reports of recent developments in their countries. Members should send in details of scientific progress, government decisions relating to science in their countries, notices of national and international meetings, et cetera, as well as sending in short articles for publication

I hope that, in 1997, I shall be inundated with copy from all corners of the globe!!!

With very best wishes to you all in 1977.

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PRESIDENT'S COLUMN

John Hubbell

SEASON'S GREETINGS, PUNCTUATION MARKS AND A FAREWELL

The International Radiation Physics Society "global radiation physics family", spanning many different countries, climates, customs, religious expressions, hemispheres (East-West, North-South) and other "general human family" differentiations, has at its disposal a great variety of contexts in which we can greet one another as one year ends and another year starts. In India we (as a global family) recently celebrated Dhiwali, with colored lights sparkling in the Calcutta night and exchanges of hand-painted greeting cards between family and friends. In much of the Western world, as (in the Northern Hemisphere) we progress deeper into the chills of winter, Hanukkah and then Christmas afford occasions for the annual exchange of greetings with family and friends near and far. In Russia, Father Frost and the Snow Princess show up in the beautiful artwork in the New Years greeting cards from this part of the world, while the Three Kings arrive on some greeting cards from South America.

A little later, we are reminded of the twelve-year animal-symbol cycle in East Asia, as we receive greeting cards from China, Japan and elsewhere in the Orient informing us that 1997 (the year 4695 in the Chinese calendar, commencing February 7) will smile on us as the Year of the Ox (my own year, as I was born in 1925 [4623]). 1996, from which we have just departed, was the Year of the Rat, who is considered shrewd and clever for purposes of birth-year characteristics.

As the season further progresses past mid-winter, our Islamic IRPS members will be observing the high-holy month of Ramadan (after the traditional clear-night confirmation of the new moon), the ninth month of the Islamic year 1417 which advances to 1418 May 8, 1997. And so, throughout the globe and its diverse cultures, the year, determined by the earth's 23 tilt of its rotational axis and the period of its majestic circuit around our particular star, has been endowed by us with these nice "punctuation marks" to separate one year from another.

My wife Jean and I also enjoy the weekly "punctuation mark" of one special day of the week set aside for religious observance, keeping the weeks properly separated and defined, rather than run together in a deadly unbroken continuum. On a much longer time-scale (a lifetime), I wish at this point to thank the National University of Córdoba (founded in 1613 by Jesuit priests), Argentina, particularly Prof. Raúl Mainardi, for a major "punctuation mark" in my life in 1996 in the form of the degree of Doctor Honoris Causa. Whatever (and whenever) is your own year-change "punctuation mark," this is a good time and season to exchange personal greetings and remembrances with IRPS and other friends and family.

To all fellow members of the IRPS, I hope your 1996 [4694] Year of the Rat was kind to you, and I wish you well in your Year of the Ox which Jean and I will share in person with many of you at ISRP-7 in Jaipur, India February 24-28, 1997.

Then, following Jaipur, we creep ever closer to our Year of the Dragon (very auspicious!) 2000 [4698] when our triennial IRPS "Brigadoon" recurring miracle again occurs as we materialize and congregate from the far reaches of the earth to "come alive" together for a week as an assembled "global radiation physics family" at ISRP-8 (2000) in Prague to share in person our entry into the new millennium.

Personally and on behalf of the IRPS, I wish you all

GREETINGS OF THE SEASON

in whatever cultural "punctuation mark" year-change context you find yourself.

Also, as I leave the IRPS Council at the expiration of my Presidential term at ISRP-7 in Jaipur in February 1997, I wish both the carry-over and the incoming Council members a productive and pleasant three years and beyond, as the IRPS continues to establish itself as a growing and useful entity among the family of international scientific societies. Jean and I look forward to greeting many of you in person, both Council and general members, as the little silver bell, presented to us by Prof. Ernesto Casnati at our International Radiation Physics Society Founding Meeting ISRP-3 in Ferrara, Italy in 1985, is passed on to the next IRPS President, at ISRP-7 in Jaipur, India February 24-28, 1997.

REPORTS FROM VICE PRESIDENTS AND COUNCILLORS

High Mono-Energetic Neutron Calibration Facilities and Associated R & D Programs in Japan

Councillor Takashi Nakamura (Japan)

Quasi-monoenergetic high energy neutron fields, produced by 7Li(p,n) reaction, have been developed at three cyclotron facilities in Japan; Cyclotron and Radioisotope Center of Tohoku University, Aoba, Aramaki, Sendai, Miyagi (CYRIC), Takasaki Research Establishment of Japan Atomic Energy Research Institute, Watanuki-cho, Takasaki, Gunma (TIARA), and Institute of Physical and Chemical Research, Hirosawa, Wako, Saitama (RIKEN).

1) ***CYRIC Neutron Field***

The CYRIC neutron field was set up in the 45-m-long neutron TOF (time-of-flight) room. The 25 and 35 MeV proton beams were transported to the scattering chamber through a beam swinger system in the target room to hit a 2-mm-thick natural Li target having about 2 MeV loss of incident proton energy. The proton beam was inclined at 10 degrees to the horizontal line with a beam swinger in order to shield spurious neutrons produced from the Faraday cup. The neutrons produced at 10 degrees were extracted to the TOF room through the double collimators. The first collimatorc onsists of 1-m-thick concrete with a 20 cm x 8 cm aperture. The second collimator, which is situated in a 2.83-m-thick concrete wall with a 100 cm x 50 cm aperture, consists of 30-cm-thick iron and 30-cm-thick polyethylene with a 30 cm x 20 cm aperture.

For measurement of the absolute fluence of neutrons in the high energy peak and relative spectral neutron fluence, three methods were used; a proton recoil counter telescope (PRT), an activation method of Li target, and the TOF method using an organic liquid scintillator. The PRT consists of Si-SSD dE counter and NaI(Tl) E counter coupled with a large annular type polyethylene radiator. The absolute neutron fluence of the mono-energetic peak region is also given by the activation technique of the Li target using the 7Be activity from the 7Li(p,n)7Be reaction. Two monoenergetic peaks at 22.2 and 32.9 MeV (with a 1.9 and 1.8 MeV FWHM, respectively) can be obtained by 25 and 35 MeV proton bombardment, respectively. The spectra have a low energy continuum, coming from the higher excited states of 7Be. The neutron fluence during the experiment is monitored simultaneously with the 238U fission chamber at a fixed loaction closely to the target. The 22.2 and 32.9 MeV peak neutron fluences are 1.2E3 and 1.8E3 n cm-2 microC-1 at the collimator exit about 8.6 m from the target. The neutron beam size is 20 cm x 30 cm, the fluence fraction of the low energy continuum is about 50% of the total and the highest proton beam intensity is about 1 microA. In this neutron field, calibration experiments for various neutron detector responses have been done.

2) ***TIARA Neutron Field***

The TIARA neutron field has been established for the neutron shielding and cross section experiments. The 3.6 to 6.6 mm thick 99.9%-enriched 7Li targets positioned in a target chamber in the cyclotron room were bombarded by the proton beams of 45, 50, 55, 60, 65, 70, 80 and 90 MeV at 0 deg. The protons that penetrated the target were bent down toward the beam dump by the clearing magnet and their integrated charges were measured with the current integrator through a Faraday cup. The neutrons produced at 0 deg were extracted through a 10.9-cm-diam collimator penetrating a 220-cm-thick concrete wall between the cyclotron and the experimental rooms. An empty space of 120 x 120 x 120 cm, with 340-cm-thick concrete walls, is equipped for shielding experiment. The absolute fluences of source neutrons in the monoenergetic peak per proton beam charge were determined with the same PRT as used in the CYRIC field. The neutron fluence during the experiment was monitored simultaneously with the 238U and 232Th fission chambers fixed closely to the target. The energy spectra were measured with the PRT and the TOF method using the VC501A organic liquid scintillator. The TOF spectra and the PRT spectra show good agreement at both the peak region and the continuum region. The peak neutron fluences are 17000-40000 n cm-2 microC-1 at the collimator exit behind 4 m from the target for 45 to 90 MeV proton beams. The highest proton beam size is 10.9 cm diam, and the fluence fraction of the low energy continuum is about 50% of the total.

In this neutron field, the following studies have been done and are now in progress and planning under the Universities and JAERI collaborative research project:

- neutron activation cross section measurement
- neutron spectral and dose distributions in and transmitted through material
- neutron leakage through labyrinth
- thick target neutron yield measurement with light heavy ions
- charged particle production cross section measurements, such as the (n,p) and (n,d) reactions
- calibration and response measurements of various neutron detectors
- neutron scattering cross section measurement.

3) ***RIKEN Neutron Field***

The RIKEN neutron field has been established at the E4 experimental room of the separate sector ring cyclotron. The proton beams with energies of 80, 90, 100, 110, 120, 135, 150 and 210 MeV were incident on a 10 mm thick 99.8% enriched 7Li target in the target chamber through the beam swinger. Protons passed through the target were cleared out by the magnet and absorbed in the spectrograph coupled to the beam swinger system to measure the proton beam current. Neutrons produced at 0 deg were extracted through the vacuum window of 3-cm thick acryl and transported through the iron-concrete collimator of 22 cm by 22 cm aperture and 120 cm length. The neutron spectra were measured with the TOF method using BC501A and the absolute neutron fluence with the Li activation method using the 7Be activity from the 7Li(p,n)7Be reaction. The peak neutron fluences at the collimator exit behind 8.37 m from the target are about 13000 n cm-2 microC-1 for 80 to 210 MeV proton beams. The highest proton beam intensity is about 100 nA, the neutron beam size is 22 cm by 22 cm, and the fluence fraction of the low energy continuum is about 50% of the total.

In this neutron field, the following studies have been done and are now in progress:

- neutron activation and spallation cross section measurements
- thin target neutron yield measurement with light heavy ions
- calibration and response measurements of various neutron detectors. A neutron shielding experiment is also planned in the near future.

The Japanese research groups who participated in the above-mentioned studies include:

- Prof. Takashi Nakamura's group,Cyclotron and Radioisotope Center of Tohoku University
- Prof. Mamoru Baba's group,Department of Nuclear Engineering of Tohoku University
- Prof. Tokushi Shibata's group, Institute for Nuclear Study of University of Tokyo
- Prof. Kazuo Shin's group, Department of Nuclear Engineering of Kyoto University
- Prof. Yukinobu Watanabe's group, Department of Nuclear Engineering of Kyuushuu University
- Prof. Hideo Hirayama's group, National Laboratory for High Energy Physics (KEK)
- Dr. Noriyoshi Nakanishi's Group, Institute of Physical and Chemical Research
- Dr. Hideshi Yasuda's Group,Tokai Laboratory, Japan Atomic Energy Research Institute (JAERI)
- Mr. Susumu Tanaka's group, Takasaki Laboratory, Japan Atomic Energy Research Institute (JAERI)
- Dr. Kazunobu Fujitaka's group, National Institute of Radiological Sciences.

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The Australian Synchrotron Research Program

Councillor Dudley Creagh (Australia)

The Australian Synchrotron Research Program was funded early in 1996 to the extent of $12,200,000 in the recent round of funding under the Australian Government's Major National Facilities Program. It has as its principal aim the extension of Australian access to synchrotron radiation sources for research in a variety of fields.

Specifically, it has provided the funding to enable the ASRP to become a member of three consortia at the Advanced Photon Source (Argonne National Laboratories and the University of Chicago):

- SRI-CAT - a consortium involved in the design and development of advanced instrumentation (detectors, monochromators, tomographic imaging techniques);
- BIOCARS - a consortium dedicated to the solution of biological problems, studies of pharmaceuticals, drug design, protein crystallography, time resolved studies of changes in structure in biological systems, using such techniques a multiple wavelength anomalous diffraction and time resolved Laue scattering;
- CHEMMATCARS - a consortium dedicated to the solution of problems in materials science, especially those at surfaces and interfaces, using techniques such as x ray reflectivity, small angle x ray scattering, grazing incidence x ray diffraction,

and the extension of our current involvement at the

- Photon Factory, Japanese Laboratory for High Energy Physics, Tsukuba, where the Australian National Beamline Facility has operated successfully for the last six years. This versatile experimental facility has been visited by more that ninety research groups, and research has been conducted using techniques such as powder diffraction, single crystal triple axis diffraction, x ray reflectivity and grazing incidence x ray diffraction, XAFS and XANES, ultra small angle scattering, as well as pioneering new techniques such as phase contrast x ray tomography and x ray tensometry.

The ASRP is itself a consortium of Australian Universities and Australian Government instrumentalities. Its university members include: the University of Queensland, the University of New South Wales, Sydney University, the Australian National University, the University of Canberra, Melbourne University, Monash University. The project is supported by the Australian Nuclear Science and Technology Organization (ANSTO) which also administers the ASRP.

It has a Board comprising members of all the consortium partners which establishes policy with respect to the operation of the ASRP. Day-to-day operations are supervised by an Executive Committee, which comprise the Chairmen of the Specialist Committees and a member from ANSTO.

Each of the four involvements listed above has a Specialist Committee in charge of its operations. The chairmen of these committees are:

- SRI-CAT - .Professor Keith Nugent (Physics, University of Melbourne)
- BIOCARS - Dr Mitch Guss (Biochemistry, University of Sydney)
- CHEMMATCARS - Dr Ian Gentle (Chemistry, University of Queensland)
- Photon Factory - Professor Dudley Creagh (Information Sciences & Engineering, University of Canberra)

The work of the first three of these committees is just beginning, as is our involvement in the workings of the CARS Board of Governors in Chicago. We provide two members to that Board, which establishes policy and reviews progress, both in terms of construction and scientific excellence.

The work of the Photon Factory is a continuation of our earlier work, with extensions to other beamlines, especially those for precise spin-charge-electron density measurements and soft x ray-photon emission studies.

The next five years will provide the opportunity for Australian scientists to use facilities which are of the highest quality, and to enhance further the reputation of Australian science.

REPORTS FROM MEMBERS

Minutes of the 3rd Radiation Physics Conference

M.A. Gomaa

Chairman of the 3rd Radiation Physics Conference
C/- Atomic Energy Authority
101 Kasr El-Eini St., Cairo, Egypt

The 3rd Radiation Physics Conference was held in Al-Menia Computer Centre from 13 to 17 November 1996. Al-Menia is 250 km south of Cairo.

The Conference activities started after the opening ceremony with two general lectures. The Chairman of the Egyptian Atomic Energy Authority gave the first one with a summary on "40 years of Egyptian Activities in Atomic Energy". Professor Anas El-Naggar's topic was "Ten years after Chernobyl".

Several invited talks were presented by

- Professor Alian on Radon Measurements in Water
- Professor Wietska of Poland on Ion Implmentation using X-ray Techniques
- Professor Magahid on Energy and Environment
- Professor Abdel-Aziz on New Trends in Accelerators
- Professor Ruden of Sweden on Radiotherapy Machines
- Professor Solowinsk of Poland on Intermediate and High Energy Nuclear Reactions
- Professor Katoh of Japan on Internal Dosimetry
- Professor Shinaway on Transport of Radioactive Material Codes.

Along with the invited contributions, 13 scientific sessions took place. In general, 65 contributed papers were presented by authors from Japan, Poland, Ukrania, Qatar, Saudi Arabia, Lybia and Egypt. These papers can be classified as follows :

1.	Radiation sources, plasma, accelerated and high energy	16
2.	Radiation effects and applications	15
3.	Radiation detection and dosimetry	14
4.	Radiation shielding and protection	11
5.	Radon and environment	9

Contributors of the scientific papers belong to Research Institutes and Universities.

The social activities of the Conference included the following :

- A reception held in Cairo before the Conference

- Al-Menia University student folk dancing
- A visit to historic (2000 years old) village.

The Proceedings of the Conference shall be published after reviewing in the Egyptian Journal of Physics.

Several recommendations were suggested with the aim of strengthening co-operation between Research Institutes and Universities of Egypt, the Arab world and abroad. Furthermore, it is hoped that Radiation Physics Conferences will strengthen relations with international societies.

The next Conference shall be at Alexandria University.

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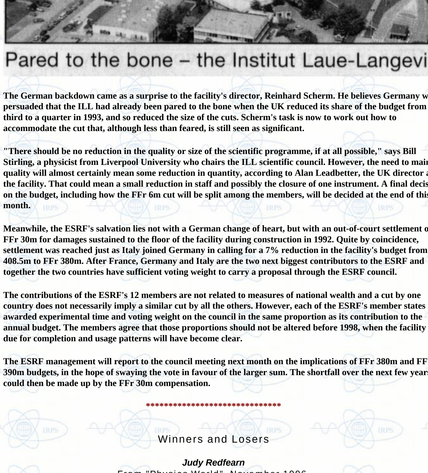
WORLD NEWS

Reprieve for European Labs

Judy Redfearn
From "Physics World", November 1996,
Vol. 9, No.11, page 5

Two of the European research facilities threatened with major budget cuts by Germany will not now suffer the full impact of the reductions (Physics World September p5). They are the Institut Laue Langevin (ILL) neutron source and the European Synchrotron Radiation Facility (ESRF), both in Grenoble, France.

Germany withdrew its threat to cut its contribution to the ILL by 7.3% at a special meeting of delegates last month. Together with France and the UK - the other major parties in the ILL - Germany agreed to reduce the facility's operating budget from FFr 281m (about £44m) to FFr 275m next year, a 2.1% cut. A separate budget of FFr 32m for the supply and reprocessing of highly enriched uranium for the ILL's high-flux reactor will not be reduced.



Pared to the bone – the Institut Laue-Langevin

The German backdown came as a surprise to the facility's director, Reinhard Scherm. He believes Germany was persuaded that the ILL had already been pared to the bone when the UK reduced its share of the budget from a third to a quarter in 1993, and so reduced the size of the cuts. Scherm's task is now to work out how to accommodate the cut that, although less than feared, is still seen as significant.

"There should be no reduction in the quality or size of the scientific programme, if at all possible," says Bill Stirling, a physicist from Liverpool University who chairs the ILL scientific council. However, the need to maintain quality will almost certainly mean some reduction in quantity, according to Alan Leadbetter, the UK director at the facility. That could mean a small reduction in staff and possibly the closure of one instrument. A final decision on the budget, including how the FFr 6m cut will be split among the members, will be decided at the end of this month.

Meanwhile, the ESRF's salvation lies not with a German change of heart, but with an out-of-court settlement of FFr 30m for damages sustained to the floor of the facility during construction in 1992. Quite by coincidence, settlement was reached just as Italy joined Germany in calling for a 7% reduction in the facility's budget from FFr 408.5m to FFr 380m. After France, Germany and Italy are the two next biggest contributors to the ESRF and together the two countries have sufficient voting weight to carry a proposal through the ESRF council.

The contributions of the ESRF's 12 members are not related to measures of national wealth and a cut by one country does not necessarily imply a similar cut by all the others. However, each of the ESRF's member states is awarded experimental time and voting weight on the council in the same proportion as its contribution to the annual budget. The members agree that those proportions should not be altered before 1998, when the facility is due for completion and usage patterns will have become clear.

The ESRF management will report to the council meeting next month on the implications of FFr 380m and FFr 390m budgets, in the hope of swaying the vote in favour of the larger sum. The shortfall over the next few years could then be made up by the FFr 30m compensation.

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Winners and Losers

Judy Redfearn
From "Physics World", November 1996,
Vol. 9, No.11, page 7

France's chief research agency, the Centre National de la Recherche Scientifique (CNRS), will receive a 1.12% increase in funding next year, taking its income to FFr 13.3bn (about £1.6m), despite the government cutting the overall research budget by 1.5% to FFr 52.3bn. The CNRS suffered a financial crisis two years ago when it was revealed that, for several years, payment from government had fallen short of the amount promised (Physics World November 1994 p5). The mismatch between promises and payments is now completely resolved, says Guy Aubert, CNRS director-general. "We will have real money to pay people and take some actions," says a CNRS spokesperson.

The atomic energy agency, and the French space agency, CNES, have also fared relatively well - their budgets remain static. CNES, which spends about 18% of France's civilian research budget, will thus be able to fulfil its obligations to international space programmes, such as the international space station and the Ariane 5 recovery plan. The largest increase of all, though, goes to university research which will increase by 3.15%.

Education and research did better than most areas of government spending. Like Germany, which announced major budget cuts in July, France wants to reduce its budget deficit to qualify for membership of the single European currency in 1999. Many government departments have therefore suffered major cuts, including the industry ministry whose budget will be reduced by 16.7%.

Higher education, however, has fared best of all with a 5.4% increase to fund 4000 new university posts (academic and administrative) this autumn and 2700 next year. The government hopes that this investment will persuade CNRS staff to take up university posts. University research has traditionally suffered from lower status than CNRS research and there have, for some time, been attempts to increase the movement of researchers between the two.

The situation has become more pressing as the average age of CNRS researchers has increased and salaries are taking up an increasing proportion (now 80%) of the agency's budget. Some of the vacated posts will be left unfilled and the rest will be filled with younger, cheaper researchers.

The government is also asking the CNRS, in common with other government agencies, to cut its administrative costs. Plans to reorganize the CNRS should be made public by the end of the year.

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Students Shun Physics

Michael de Laine, Koge, Denmark
From "Physics World", November 1996,
Vol. 9, No.12, page 6

The popularity of physics, chemistry and mathematics is falling dramatically at Danish universities and funding for the subjects is threatened. This comes despite assurances from Danish politicians earlier this year that a temporary drop in interest for the natural and technical sciences would not affect the quality of education.

Henrik Jeppesen, dean of the faculty of natural sciences at the University of Copenhagen, reports a recent drop of 200 students in physics, chemistry and mathematics - 40% of each faculty's population. As state funding for university education is partly based on student numbers, the faculty faces a fall in fimding. "We're losing DKr 20m (about £2.l m) in 1996. Our budget for 1997 shows a deficit of DKr 30m. As 80% of our expenses is pay, there's only one place to cut," says Jeppesen. From January, 30 researcher-teachers and 18 technical--administrative personnel - 7% of the faculty's staff- will be out of work.

Jens Oddershede of the University of Odense has seen student numbers fall by 25% in the natural sciences, resulting in a cut of DKr 10m in education funding. Although no staff sackings are foreseen for 1997 or 1998, "unless this trend stops and further resources are made available, we won't have the money to continue at the current level," says Oddershede.

A proposed solution to the funding crisis involves the transfer of funds from other faculties. Indeed, Torben Kornbech Rasmussen, of the Danish Ministry of Education, says that at the University of Copenhagen, other faculties make a profit and the university can use its financial reserves. But Kjeld Mollgaard, rector of the university, says that the ministry's own guidelines forbid the transfer of education funding from one faculty to another.

Jeppesen and Oddershede agree that the educational system is at the root of the fall in natural science students. "Pupils entering sixth-form college opt out of mathematics, physics and chemistry. Then when they've finished they're not interested in us," says Jeppessen. "I hope and believe that we can get more undergraduates and more money, partly through a marketing campaign aimed at sixth-form colleges."

Jeppesen believes that the fall in the number of natural science undergraduates is a European tendency. "Young people are more interested in philosophy," he says. "But there's a great deal of philosophy in the natural sciences - Niels Bohr, Albert Einstein, the Big Bang theory. They might just as well come to us," he says.

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Germany Squeezes CERN

Alison Goddard
News Editor
From "Physics World", November 1996,
Vol. 9, No.12, page 9

The fate of the Large Hadron Collider (LHC) at CERN, the European labora-tory for particle physics, will be decided later this month. Just two years after the CERN council approved construction of the SwF 2bn (about £940m) accelerator, the project is facing financial difficulties. German officials are reported to be ready to give notice to quit CERN unless their demands for a reduced subscription are met. It is rumoured that the necessary documentation will be at the German permanent mission in Geneva in time for the CERN council meeting on 20 December.

Germany is seeking a 8.5% reduction in its subscription for 1997 and 1998, and a 9.3% reduction for two years after that. Last month CERN's committee of council, the body which advises the full CERN council, discussed whether Germany should be given a unilateral reduction. However, the proposal received little sup

port. It is more likely that the subscrip-tions of all member states will be reduced, forcing CERN to make up the shortfall by internal savings and, perhaps, bank loans.

However, the committee did recom-nend that the LHC should be built in a single stage and be ready for experiments at 14 TeV by 2005. A plan for achieving this under the new financial circum-stances will be presented to the council meeting. This option depends on contributions from non-member states such as Japan and the US. Under the original construction timetable, which does not require non-member contributions, the LHC would be ready for experiments at 10 TeV in 2004 and 14 TeV in 2008.

Meanwhile, the UK government has stated that the science budget must bear the fluctuations in exchange rates and net national income that determine the level of the UK's subscription in sterling. The decision was made public in the government's response to the House of Commons select committee on science and technology's inquiry into the Particle Physics and Astronomy Research Council.

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