US polar research

NSF break with Coastguard?

Washington

PLANS for polar research have been upset by the US Coastguard's recent downgrading of one of its ships, *Glacier*, which is no longer classified as an "icebreaker", but described as "ice-strengthened" instead. As a result, the National Science Foundation (NSF) may break with the US Coastguard, and find polar research vessels elsewhere.

Glacier was considered the most suitable of the Coastguard's icebreakers for research, and the discovery that its hull has been seriously weakened by corrosion has re-opened the debate about whether Coastguard ships are still suitable as research platforms for NSF. Two new Coastguard icebreakers should be completed in 1992 or 1993, but NSF will have to span the gap from now until then.

The nub of the problem is that Coastguard ships are primarily military vessels not well equipped for research. Two years ago, NSF leased one small research icebreaker, *Polar Duke*, and is also now taking research space on the West German icebreaker *Polarstern*, which has superior research facilities. But restoring *Glacier* to icebreaker status would cost $20 million and NSF considers the cost would be too great.

Instead, officials want the use of a dedicated research icebreaker from another source, either by collaboration with another country or by leasing. Without NSF support, the Coastguard cannot justify large expenditures on *Glacier*, although it says no final decision has been taken. Loss of the NSF account would mean about $2.3 million a year.

Scientific interest in Antarctica seems to be increasing year by year. Investigation of the Antarctic ozone hole seems now to guarantee that interest will not wane. NSF, as well as using *Glacier*, has also frequently used two other Coastguard icebreakers, *Polar Star* and *Polar Sea*. But these are unpopular with researchers and in need of refits.

Glacier is working this season in the Antarctic ice edge zone, pushing but not breaking ice. Research has not been unduly affected this year, but it could be if NSF were tied to the ship. The two new vessels due next decade will provide better accommodation and facilities than any existing Coastguard ship. Meanwhile, NSF is looking at its options. **Tim Beardsley**

First leptonic collisions at Japan's KEK

Tokyo

TRISTAN, the giant accelerator at Japan's High Energy Physics Laboratory (KEK), burst into action last week when electrons and positrons were smashed together at a record-breaking centre-of-mass energy of 50 GeV in the accelerator's 3-km main storage ring. And with foreign competition breathing down its neck, the TRISTAN team is now racing to get its experimental programme into full swing.

After successful tests of the electron and positron beams at 25.5 GeV earlier this month (see *Nature* 324, 7; 1986), KEK scientists set the counter-rotating beams in the main ring on collision course and the first hadronic-like event was picked up by the partially instrumented VENUS detector shortly before midnight on 18 November, followed a few hours later by a collision producing large-angle Bhabha scattering.

The record set by TRISTAN exceeds the maximum of 47 GeV achieved by the PETRA ring in Hamburg. But the maximum luminosity obtained, 2×10^{29} cm^{-2} s^{-1}, is barely a hundredth of TRISTAN's design capability, and the electron- and positron-beam currents, at present operating at around 1 mA, will have to be raised before a serious search for new elementary particles can begin.

Aerial view of the TRISTAN complex.

AMY, a detector built in collaboration with teams from the United States, Korea, China and Japan, has just been rolled into position in one of the four experimental halls on the main ring. And the TOPAZ detector, now undergoing tests with cosmic rays, should be in place next spring ready for the full experimental programme to begin in early May 1987.

TRISTAN thus has a head start on its most immediate rival, the Stanford Linear Collider, whose even higher energy electron–positron collisions are not expected for at least a few months. Even then, the linear collider will be limited to a single energy, producing showers of intermediate vector bosons (the Z^0), TRISTAN will have about two years as the world's most powerful flexible electron–positron ring collider until the LEP ring at CERN comes on line in 1988. David Swinbanks

Optical interferometry

Large grant for new instrument

Sydney

THE University of Sydney has won a grant of A$500,000 to begin construction of a 640-m baseline high-resolution stellar interferometer. This development is a milestone for stellar astronomy (and for the Chatterton department of astronomy at Sydney) as well as for the Australian Research Grants Scheme, whose budget is so small that projects on this scale have so far been beyond its scope.

The new instrument will be a larger version of a prototype instrument built by Sydney over the past 15 years. Only about 30 stars, mostly bright giants, have so far had their apparent diameters measured to an accuracy within 5 per cent by this technique. The new interferometer telescope will be able to measure the apparent diameter of 50,000 stars (brighter than 8th magnitude) with an accuracy of 2 per cent or better.

Measurement of the apparent size of stars whose distance is known should allow the establishment of fundamental scales of stellar diameters and luminosities to be established. Observations of close binary stars can give all the parameters of the system, including their orbits, temperatures, luminosities, diameters and distances. Other problems the interferometer could help solve include mass loss, by observing how a star's envelope appears to grow at longer wavelengths, and stellar rotation, by observing the flattening of the poles.

All the essential technology for the interferometer telescope has been proved in a prototype developed by the Sydney University team, led by Dr John Davis, over the past 10 years. The prototype has an 11.4-m baseline with a steerable mirror at either end. The mirrors capture the light from a star which is then reflected to a central optical bench where the beams are combined and interference fringes observed. The prototype will form the heart of the new instrument.

The principle on which the new interferometer will operate is amplitude interference, its design being a development of Michelson's classic interferometer. Amplitude interferometry has not previously been a workable option because of the blurring caused by atmospheric 'seeing' effects. Until this year the Australian Research Grants Scheme has been restricted to grants of less than A$150,000. The $150,000 grant for the interferometer marks the beginning of the government's policy of more funds for the scheme concentrated into fewer but more highly rewarding grants (see *Nature* **323**, 98; 1986).

Charles Morgan