

The compact high resolution lepton detector AMY now being constructed by a Japan/US/Korea/China team for use at the TRISTAN electron-positron collider at the Japanese KEK Laboratory. Inside the 3T superconducting magnet will be a high resolution drift chamber, with muon detectors outside the magnet and the subsequent iron shielding.

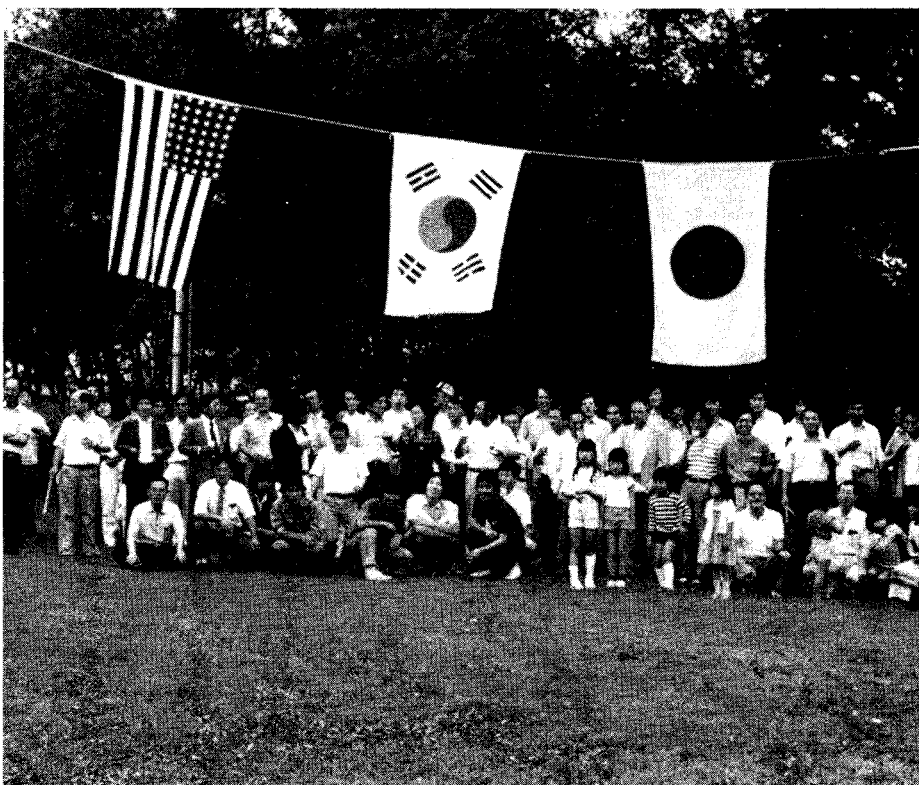
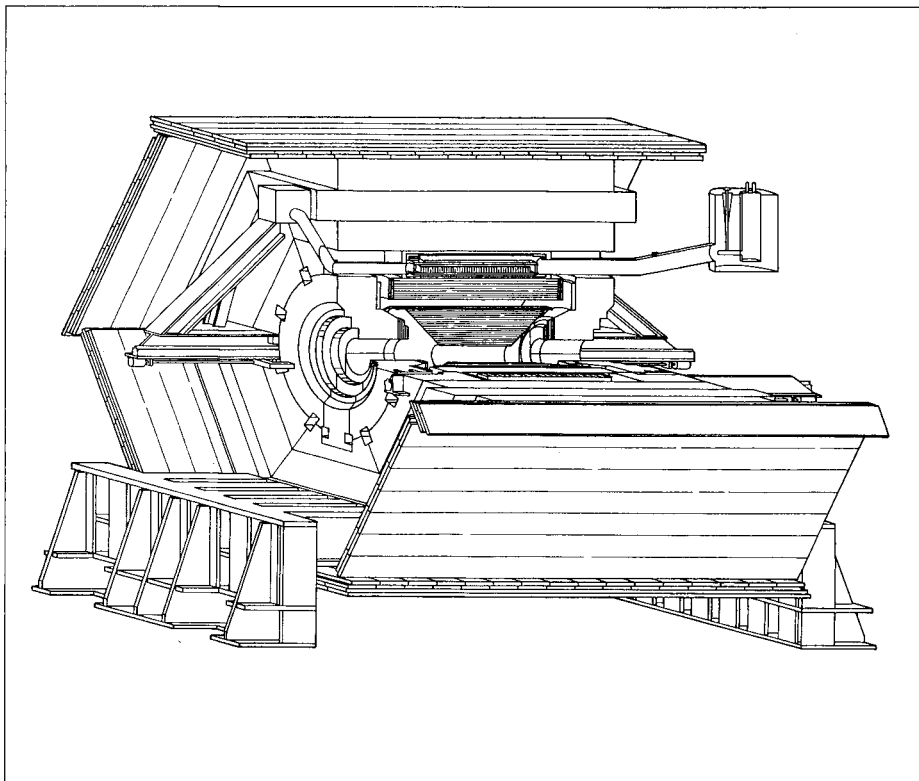
KEK Amiable AMY

The big VENUS and TOPAZ experiments appeared on the scene relatively early as part of the grand plan for the TRISTAN electron-positron collider now being built at the Japanese KEK Laboratory (see October issue, page 325). Then in 1982 letters of intent were invited for experiments to use the remaining two beam collision points available in the TRISTAN machine.

One outcome is AMY, a Japan/US/Korea/China collaboration, which along with the Collider Detector Facility (CDF) at Fermilab, is one of the major examples of US/Japan collaboration in particle physics. While CDF is a much larger project, the level of Japanese collaboration in AMY is higher (50 per cent versus about 15 per cent in CDF).

A modest detector by some present day standards (overall weight 750 tons and a height of 5.5 m), AMY is about five times smaller than the two big detectors being assembled at KEK. However this does not dampen the enthusiasm or lower the physics horizons of the team exploiting this compact high resolution lepton detector.

To achieve good resolution in such a relatively small detector, an internal magnetic field of 3 T will be supplied by a superconducting magnet using thick 8 cm copper clad winding, so that only muons will be of interest outside the magnet yoke. Two layers of iron shielding outside the magnet will purify the muon signal.



Fourth of July AMY style, with Koreans, Japanese and Chinese joining the traditional US Independence Day celebrations.

Focusing quadrupoles penetrating deep into the detector's forward regions will also ensure that AMY benefits from maximum collision rates of electrons and positrons, which could attain several times the level seen in the other experimental areas.

Immediately surrounding the collision region will be the cylindrical tracking chamber (KEK and Rochester) being assembled in the KEK workshops. A special hexagonal geometry has been designed to exploit the high magnetic field, and the 32 000 wires between an internal diameter of 30 cm and an outer diameter of 130 cm promise a resolution down to about 100 microns.

Outside the tracking chamber in the final version of the detector will be xenon X-ray counters fitted in a 10 cm radial gap to pick up

the synchrotron radiation from electrons. However this will probably not be ready for the initial runs, when trigger counters supplied by Beijing will be used.

Immediately inside the magnet will be the (lead and plastic) electromagnetic shower counter, the responsibility of a Virginia Polytechnic/Rutgers/Davis sub-collaboration.

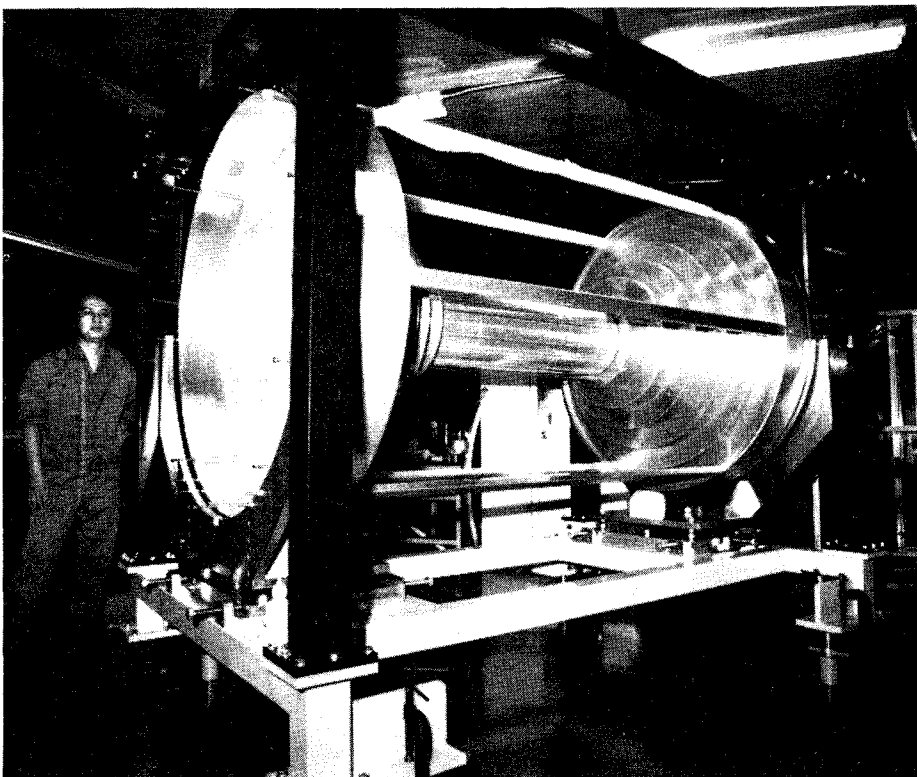
The outer muon chambers, supervised by Louisiana State and Tokyo Institute of Technology but built in the KEK workshops, will be arranged in four layers.

Most of the forward space normally reserved for endcaps will be taken up by the beam focusing quadrupoles, but veto counters will be fitted to provide some particle coverage in these regions.

As well as being compact and multinational, AMY also differs

from the two big TRISTAN experiments in the relative high use of facilities and skills available in the KEK workshops. Many of the components for VENUS and TOPAZ are supplied by Japanese industry.

Far from being discouraged by seeing bigger detectors and other machines with higher energy, the AMY team sees a great opportunity to search for new physics. The top quark is still not excluded in the TRISTAN energy range, which could be a promising place to look for signs of any further generation of quarks and leptons which might exist.



The central tracking chamber for AMY under construction in the KEK workshops. Fitted with 32 000 sense wires arranged in a special hexagonal geometry, the detector should be able to resolve down to about 100 microns.