



# The OPAL detector at LEP

1989-2000



The university of Tokyo

**LEP**, the **L**arge **E**lectron **P**ositron collider, was the largest particle collider in the world.

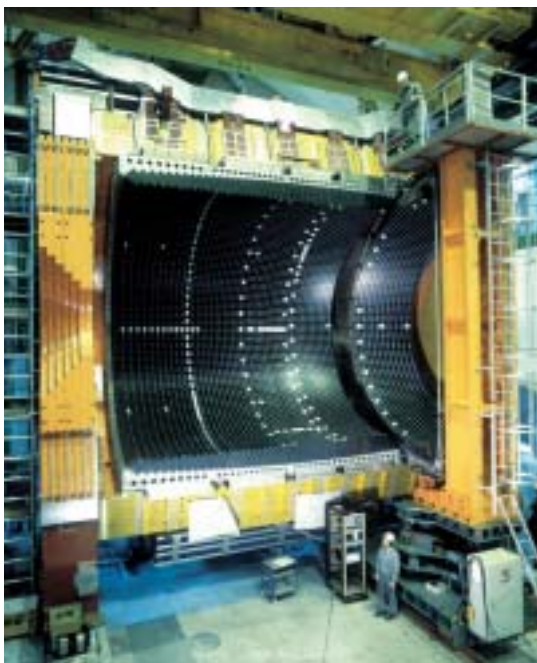
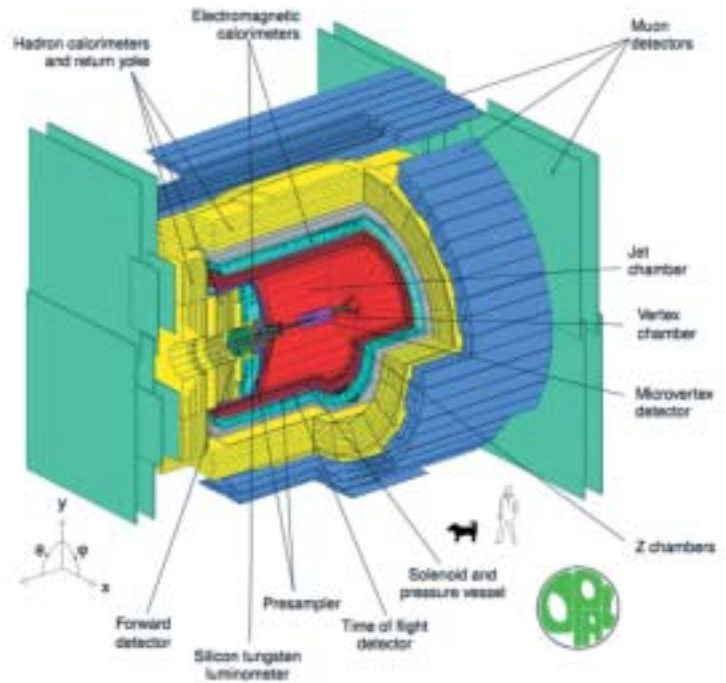
## The OPAL collaboration :

The group of physicists and engineers who designed, built and operated the OPAL detector, and analysed the data collected.

The collaboration consists of about 300 physicists from 33 institutes in Germany, Canada, Hungary, Israel, Italy, **Japan**, the United Kingdom, the United States, and CERN.

## Contribution of Japan

The Japanese group (Tokyo and Kobe) built the electromagnetic calorimeter which measures the energy of electrons and photons with high precision.



The OPAL electromagnetic calorimeter consists of about 10 000 lead-glass counters.

Diameter : 6m  
Weight : 300 tons



The components of the lead-glass counter.

**The OPAL detector** is a big apparatus which measures the energy and direction of particles produced in high energy electron positron collisions.

Height : 10 m  
Length : 10 m  
Weight : 3,000 tons

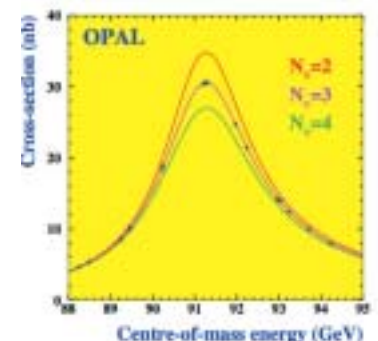
## 12 years of physics with OPAL

About 400 scientific papers have been published so far.

- LEP1(1989-1995) where millions of Z bosons were produced for high precision measurements, establishing the Standard Model of the elementary particle.
- LEP2(1996-2000): energy of the collision was increased to produce W boson pairs, and to search for new particles such as the Higgs boson and SUSY particles.



An image of a W boson pair detected by OPAL.



There exists only three types of neutrino !!