

# India Must Become Member Of CERN – OpEd

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The European Organization for Nuclear Research (CERN) has emerged as the world's leading laboratory for frontier research in physics. Recently CERN discovered the Higgs Boson, the long sought goal of physics research at its Large Hadron Collider (LHC) facility which produces the world's most powerful particle collisions. Starting off as a European organization, CERN has broadened its outreach to non-European country membership, including India, which was granted Observer status in 2002. While India has been participating in CERN's activities, it is high time that India took the step of joining CERN as an associate member state, and eventually as a full member state.

CERN was founded by 12 European states in 1954, and now has 21 European member states. In 2014, Israel became the first and only non-European member, and Pakistan became an Associate Member. It operates the world's largest particle physics laboratory located in the suburbs of Geneva on the Franco–Swiss border. In 2013, it had counted 2513 staff members, and hosted some 12,313 fellows, associates, apprentices as well as visiting scientists and engineers representing 608 universities and research facilities and 113 nationalities.

Besides 22 member states, Romania is a candidate to become a member state. Serbia is an associate member in the pre-stage to membership. "Observer" status, now changed to "Associate Member" allows non-member states to attend council meetings and to receive council documents, without taking part in the decision-making procedures of the organization. Currently, the Associate Member states are Cyprus (2012), Ukraine (2013), Turkey (2014) and Pakistan (2014). Many other countries including India and Russia, participate in CERN's work through collaboration agreements.

In 2010, CERN undertook a review of its international cooperation arrangements, including membership by non-European states. It decided to encourage states collaborating with it through Memoranda of Understanding to

seek a more formal status as Associate Member. In view of the increasing size, cost, and complexity of research projects CERN decided to open the door to full membership beyond European states.

There are three avenues for cooperating with CERN. The first track is as Member state, which provides greatest access to its activities and discussions of its governing bodies, as well as representation among its staff. The next track, created in 1967 is as a state with collaboration agreements on specific activities with CERN. Another track is as an Associate state, created in 1995, which was envisaged for non-European states then considered as not eligible for membership.

In 2010, a CERN document set out the criteria and principles for enlargement beyond Europe. Membership is now open to all countries. The CERN Council would assess the capability in the field of nuclear research of an applicant state, and the mutual benefits that could flow from membership. One criterion for membership, of a political nature, the existence of “a stable political system within the applicant State guaranteeing democracy, the rule of law and human rights”, is left to the CERN Member states to assess. Associate membership for a minimum of two years has been made mandatory as a prior stage to full membership.

The category of Observer States was abolished. The existing observer states such as Russia, India, Japan, US would have to decide whether to go for Associate Membership and then full membership. Israel has already become the first non-European Member state in 2014. Pakistan and Turkey became associate members in 2014.

India has a long record of working with CERN over the years. High-energy physicists from India, mainly from the Tata Institute of Fundamental Research (TIFR), have been participating in experiments at CERN since the 1970s. Indian Atomic Energy Commission participated in the construction of LHC and to contribute to the construction of the CMS and ALICE detectors. India also contributes to the COMPASS, ISOLDE and nTOF experiments and operates two Tier-2 Centres for the LHC Computing Grid. Indian companies Crompton Greaves and Kirloskar Systems have manufactured and supplied components including magnets for construction of the 27 km circular LHC accelerator. More than 200 Indian scientists registered at CERN, more than from China.

If India becomes an associate member it would involve costs. CERN requires associate members to pay at least CHF 1 million (about Rs 50 million ) annual contribution. For members, the contribution is calculated based on the net national income at factor cost, with adjustments possible for low per capita income countries and special circumstances. The shares of contributions of members to CERN's present annual budget of around CHF1.1 billion ranges from a low of 0.5% for Slovakia to a high of 20.3% for Germany. Israel which became the first non-European member state in 2014 has a share of 1.19%. The exact contribution of India as an Associate member and later as a full member will need to be negotiated with CERN. Some estimate that India as a member state would be expected to pay about CHF 10 million per year, (roughly Rs 500 million) to the CERN budget. In comparison, India's annual payments are Rs 1670 million to the UN and Rs 620 million to IFAD.

The payments India has to make as an associate or full member should be seen as a small price to pay for the benefits that would accrue – a place at the highest table of international scientific research, greater role in frontier scientific research, access to spin offs and intellectual property, more opportunities for Indian institutions and companies to participate in future projects, more possibilities for Indian scientists to engage with their counterparts in front line research, and greater institutional and academic collaboration involving physics and engineering. As associate member, India will have the right to attend and participate in both the open and restricted sessions of the CERN Council as also send representatives to the meetings of the organization's Finance Committee. Indians will also be eligible for appointments as staff members at CERN on contracts of limited duration and as Fellows.

Given the above, India should finalize its Associate membership of CERN without further delay and seek full membership in CERN. The proposal for associate membership has been pending with the previous government and should now be approved by the new government. This will be a great service to Indian science and open up many opportunities in the future.

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