advocates hailed as a major accomplishment that will bolster bilateral and multilateral efforts already under way.

The Cancún agreement establishes a framework that would allow wealthy nations to pay others for "reducing emissions from deforestation and forest degradation" (known as REDD) and augmenting the carbon stocks locked up in forests. Collectively, the programme is called REDD-plus. The agreement requires developing countries to craft a national plan, establish a baseline for historic emissions from forest loss and create a system for monitoring their forests. Just as importantly, says John Niles, director of the Tropical Forest Group in San Diego, California, the agreement calls on an existing technical body to look into the programme rules and requirements and then report back within a year.

"Once we have those requirements, then everybody knows what we have to get to before any money changes hands," says Niles. "This is the biggest decision we could have asked for."

"They have managed to reach agreement by moving the goalposts closer to the ball."

Delegates also agreed to establish a Green Climate Fund to be managed by representatives of the developed and developing world to help channel aid; a Cancún Adaptation Framework to help to guide decisions on funding for adaptation measures in the developing world; and a technology-transfer mechanism to supply developing nations with technology for clean energy and adaptation. As promised in Copenhagen, industrialized nations will provide some US$30 billion for these programmes by 2012, and up to $100 billion annually by the end of the decade, although where the money would come from remains unclear.

Tim Gore, climate-change adviser for Oxfam International, based in Oxford, UK, lauds the Green Climate Fund but says that countries missed an opportunity to spell out long-term climate funding, perhaps through a levy on international aviation and shipping. Nonetheless, the agreement represents "a solid step", says Gore. "They are now walking in the right direction, but they need to start running." ■

PARTICLE PHYSICS

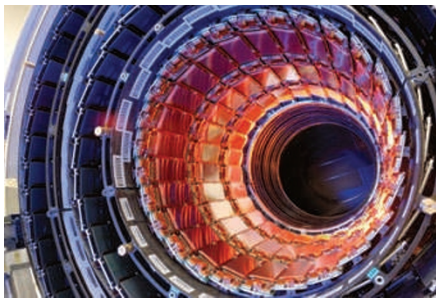
No black holes, but extra time at LHC

Upgrade likely to be delayed in bid to capture Higgs particle.

BY GEOFF BRUMFIEL

The end of the world is not nigh after all. Flouting predictions from some theorists, microscopic black holes have so far failed to appear inside the Large Hadron Collider (LHC), scientists there have revealed.

The result, which will be posted this week on arXiv.org, comes as researchers make plans to keep the LHC running until the end of 2012, rather than 2011 as previously scheduled. The 27-kilometre collider at the particle-physics laboratory CERN near Geneva, Switzerland, had endured delays and a crippling breakdown before finally surging to life late in 2009, and physicists say it is now performing above expectations.



M. BRICE/CERN

No black holes here: the Compact Muon Solenoid.

Predictions of mini black holes forming at collision energies of a few teraelectronvolts (TeV) were based on theories that consider the gravitational effects of extra dimensions of space. Although the holes were expected to evaporate quickly, some suggested that they might linger long enough to consume the planet. But scientists at the Compact Muon Solenoid (CMS) detector now say they found no signs of mini black holes at energies of 3.5–4.5 TeV. Physicist Guido Tonelli, the detector's spokesperson, says that by the end of the next run, the LHC should be able to exclude the creation of black holes almost entirely.

The find is one of a stream of recent papers from the LHC, made possible by the machine's unexpectedly high performance. "We were very surprised by how well behaved the machine was when we started really pushing it to its limit," says Steve Myers, the CERN physicist who oversaw this year's LHC operations. As a consequence, physicists are increasingly optimistic that they may be able to detect the elusive Higgs boson earlier than expected. The particle, the LHC's best-known quarry, and its associated field are thought to endow other particles with mass.

Initially, physicists were not sure that the LHC could create and detect the Higgs at the machine's current energies, and CERN managers had planned a 15-month hiatus from the start of 2012 for an upgrade that would allow it to run at higher energies. But a growing consensus holds that even without the upgrade, the LHC will be able to explore most of the energy range in which a standard Higgs particle might be found. Sergio Bertolucci, CERN's director for research and computing, adds that there are political reasons to extend the run. The world's second most powerful accelerator, the Tevatron at Fermilab in Batavia, Illinois, is nipping at the LHC's heels as it gathers a growing body of data in its own Higgs hunt. Moreover, the potential success of the LHC is likely to influence European plans for high-energy physics, as well as a global plan for a next-generation linear collider. Both face big budget decisions in the next few years.

The plan to extend the LHC's run will be discussed at a meeting of LHC managers in Chamonix, France, in late January, with a final decision expected shortly after. ■

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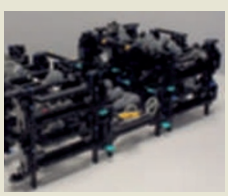

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