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Plans towards realizing a giant cosmic ray observatory after Auger South

The US decadal review ASTRO2010 noted that "Auger-South reported several important new results", such as "(1) a clear confirmation of the rollover of the energy spectrum; (2) an indication that the highest-energy cosmic rays are distributed anisotropically; (3) a strong limit on the photon fraction that rules out, in large part, top-down models for the production of ultrahigh-energy cosmic rays; and (4) the strongest limit to date on the flux of cosmogenic neutrinos between 10^{17} and 10^{19} eV." However, the panel also emphasized that US budgets do not put the US into the favorable funding scenarios for which PASAG recommended construction of Auger North. Thus, the recommendation taken by this national panel under the recognition of the current fiscal constraints in the US have delayed the international Auger North Project with its conceived site in Colorado until the indefinite future.

The Pierre Auger Collaboration has reacted to this outcome and started reshaping its plans for realizing a large-scale cosmic ray observatory as a worldwide effort. Moreover, given the substantial investments made by many countries of the current Pierre Auger Collaboration into an Auger Research and Development Array (RDA) near Lamar (Colorado), the scope and goals of the RDA were reconsidered and aligned with specific needs of Auger South. Details of these reformulated goals are documented in another Auger internal document.

The Pierre Auger Collaboration Board on its meeting in March 2011 agreed that stable operation of the Southern Observatory will continue to be of highest priority for the future and all financial and human resources should be secured to accomplish this mission.

The infrastructure build up by the Pierre Auger Collaboration in Malargüe over the last decade has enabled both collaborators and guests to carry out ambitious R&D activities at the site. These include development of new technologies of UHECR detection, such as MHz and GHz radio detection of extensive air showers as well as new methods of muon detection. These R&D activities are considered to augment the Pierre Auger Observatory detection capabilities, thereby enhancing its physics capabilities and science program. At the same time, the ongoing R&D program is to be considered exploratory and a necessary first step towards designing and constructing a giant cosmic ray observatory of the 30 000 km^2 scale.

In consideration of the resources required for operating Auger South like a 'Swiss Watch' and the need of continuing an ambitious R&D program leading to specific enhancements of Auger South, the Collaboration Board understood that the plans for constructing a much larger Observatory on a reasonable time scale can only be accomplished in a worldwide effort with strong and new strategic partners. Obviously, in order to become attractive for strong partners, an entirely new international collaboration may emerge from these activities. As another logical consequence, these new members would not automatically become members of the Auger Collaboration, unless specific applications for this are being made.

The Pierre Auger Collaboration Board authorizes the spokespersons to proactively get in contact with leading scientists including those from potential member countries interested in the science of the highest energy cosmic rays to discuss the plans

sketched above. A first open discussion for elaborating the science case of trans-GZK cosmic rays and for sketching plans on how to possibly detect them on a scale of 30 000 km^2 or more could take place in a specific workshop which is open to all interested parties. Such a workshop needs be arranged within the next year, even before the end of 2011 if possible. An attractive location for such a workshop could be CERN.

The goal is to formulate a full proposal and to find possible sites and host countries within the next three years, i.e. before 2014.

KHK & JMM
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