A complex detector array at Tibet Cosmic Ray Observatory

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An 1km² shower particle detector, water Cerenkov detector and fluorescence/Cerenkov light telescope hybrid array at Tibet cosmic ray observatory is proposed. At 4300m a.s.l., a shower muon detector array with a total active area of 130,000 m² and 2400 charged particle detectors with a spacing of 22m are designed to measure energy spectra of gamma rays from galactic sources. Using the most sensitive gamma ray detector above 50TeV, tens of shell type SNRs and other sources will be measured to search for possible cosmic ray sources. In order to monitor variable sources, 90,000 m² of the muon detector array are designed by using water Cerenkov technique that enable to trigger on low energy showers above 100GeV. Using such a detector array, cosmic ray spectrum and compositions will be well measured from 50TeV to 10PeV. 28 Cerenkov telescopes will be installed in the array for shower maximum measurement that will be utilized to determine the composition together with the muon content information. To extend the energy range to 1EeV, the telescopes will be re-configured to be a fluorescence detector array to watch over the sky above the muon detector array in the second phase of the experiment. An energy range around the second “knee” will be covered.