YangBaJing International Cosmic Ray Observatory

Institute of High Energy Physics (IHEP),CAS
Center for Space Science and Applied Research,CAS
China Meteorological Administration
Hebei Normal University
Institute of Disaster Prevention Science and Technology
Shandong University
Southwest Jiaotong University
Tibet University and Yunnan University
Tsinghua University

Hirosaki University
ICRR, University of Tokyo
Nagoya University
National Institute of Information
Nihon University
Kanagawa University
Konan University
RIKEN
Saitama University
Sakushin Gakuin University
Shibaura Institute of Technology
Shinshu University
Shonan Institute of Technology
Tokyo Metropolitan College of Aeronautical Engineering
Utsunomiya University
Waseda University
Yokohama National University

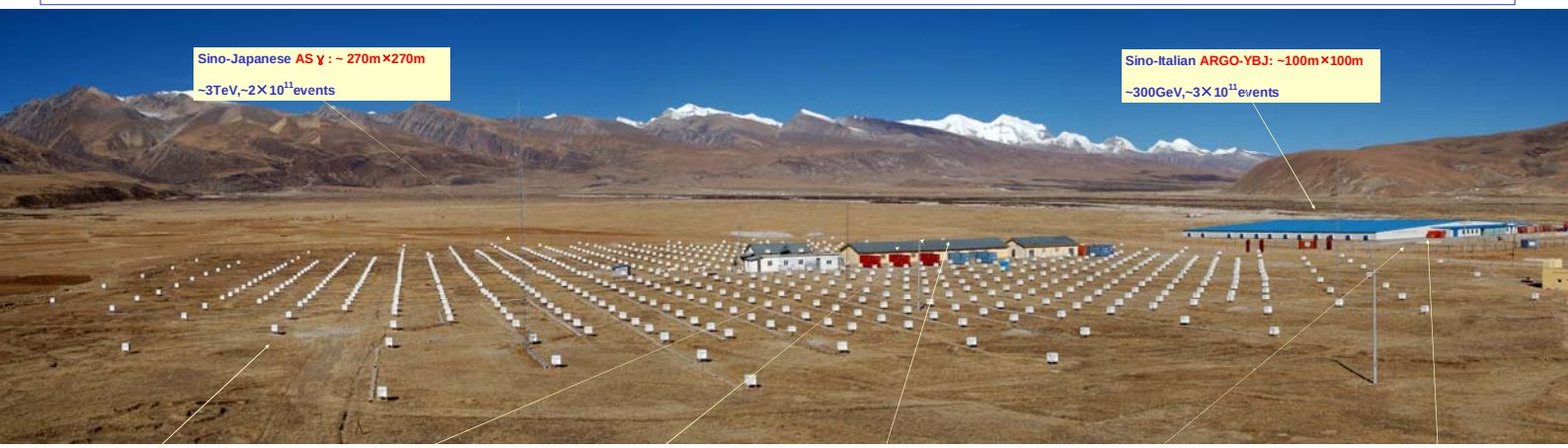
Institute of High Energy Physics, CAS
Hebei Normal University
Shandong University
Southwest Jiaotong University
Tibet University
Yunnan University

INFN and Lecce University
INFN and Napoli University
INFN Section of Napoli and University of Salerno
INFN Section of Napoli and University of Sonnio, Benevento
INFN and University Roma "Tor Vergata"
INFN and University "Roma Tre" Roma
INFN and Institute of Cosmogeo Physics of CNR, Torino
INFN Section of Catania and Institute of Physics of Cosmic
IFCA/CNR,Palerno and INFN Section of Pavia

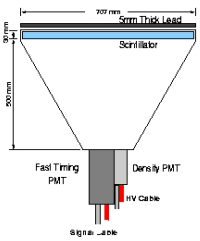
The observatory is located at 90°26'E and 30°13'N in Yangbajing (YBJ) valley of Tibetan highland, about 90KM NW of Lhasa, the capital city of Tibet, China. Currently, the YBJ observatory hosts two cosmic ray experiments. One is a Sino-Japanese collaboration called ASγ, a sampling detector with 400 m^2 sensitive area covers an effective area of about 40,000m^2 and has been operating since 1990. Another one is a Sino-Italian experiment called ARGO-YBJ, a "full coverage" carpet detector with a very large sensitive area of about 6700m^2, and has been in operation since 2006.

ASγ uses scintillation counters and ARGO-YBJ uses resistive plate chambers (RPCs) to detect the arrival times and number densities of the secondary particles, with which the original direction and energy of the cosmic rays can be determined. Both experiments study the origin and acceleration of cosmic rays by measuring the spectrum and anisotropy of cosmic rays, by observing the TeV γ rays emission etc. As a sampling detector, ASγ has a threshold energy of a few TeV while ARGO-YBJ can significantly decrease the threshold energy down to a few hunderd GeV. The two experiments have the advantages of high duty cycle and large field of view, which make them particularly suitable for sky surveys and observations of sporadic sources.

In addition, YBJ observatory is equipped with a neutron monitor system, a neutron telescope and a multi-directional muon telescope for solar cosmic rays observation. Various sensors are installed for thunderstorms, meterologic and seismological studies. Recently, one sub-mm telescope from Delingha observatory in QingHai has been moved to the site for astronomic observation. It is also planned to install a second telescope, coming from Germany.



ASγ scintillation counter



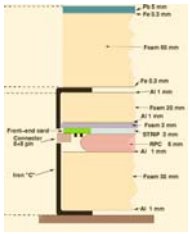
Solar neutron telescope (IHEP, Nagoya University,RIKEN)

Neutron monitor (IHEP, Nagoya University,RIKEN)

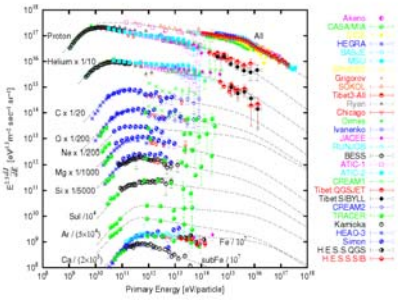
Multi-directional muon telescope and sandwich neutron system (IHEP)

ARGO hall with carpet of RPCs

Resistive Plate Chamber



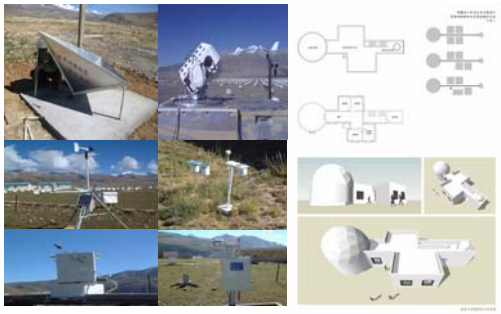
Proton/Helium spectra and sharp knee by ASγ (Phys. Lett. B 632, 58-64 (2006); ApJ, 678 1165-1179 (2008))



Corner reflector for crust deformation monitoring (IHEP & China Earthquake Administration)

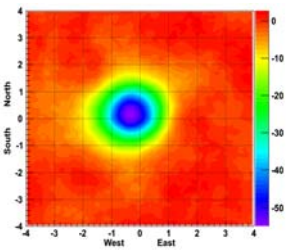
Sub-mm telescope from Delingha observatory (IHEP & MPO)

The KOSMA 3m Sub-millimeter telescope will be installed at YBJ observatory (IHEP&NAOC)

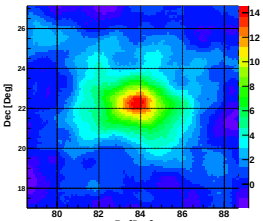


Instruments for atmospheric and meterologic observations (IHEP & Institute of Atmospheric Physics,CAS)

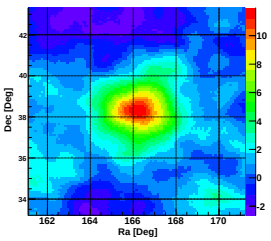
ARGO-YBJ images moon's shadow



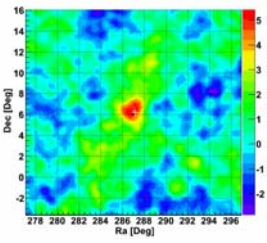
TeV γ rays from the crab nebula as observed by ARGO-YBJ



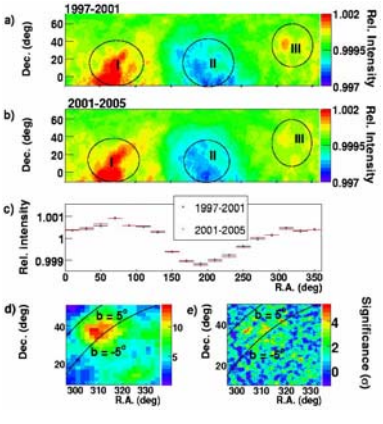
TeV γ rays emission from the extragalactic source Mrk421

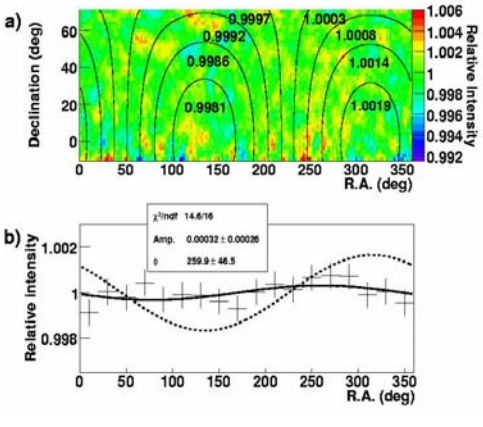


TeV γ rays emission from the MGRO 1908+06



Anisotropy and Corotation of Galactic Cosmic Rays by Tibet ASγ (Science314:439-443,2006)





Proton-Air cross section measurements by ARGO-YBJ (Phys. Rev. D 80 (2009) 092004)