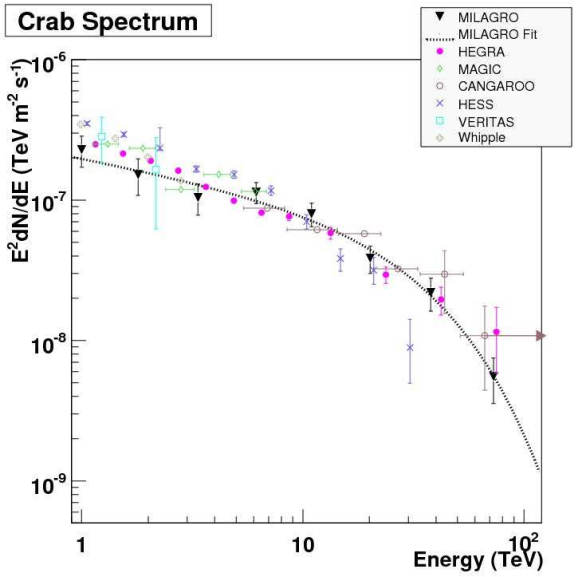


Fig. 2. Milagro Crab spectrum and comparison with other observations. The dashed line is the measured Milagro spectrum with an exponential cut-off. The Milagro data are indicated by black triangles. Our data are in good agreement with the recent measurement of a high-energy cut-off by HESS.

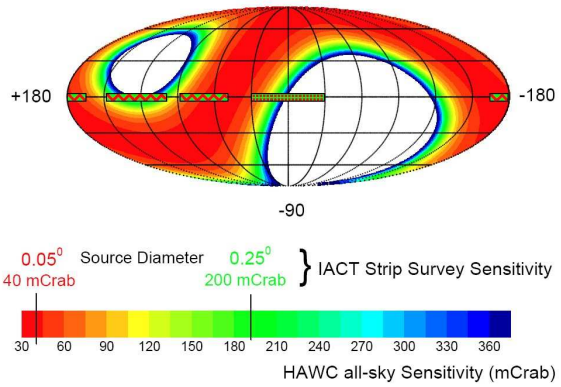


Fig. 3. Flux limits for HAWC versus the HESS sky survey and the proposed VERITAS sky survey over the next two years. HAWC is assumed to be located in Mexico (19°N). IACT sensitivity is shown for point (red) sources and for sources extended by 0.25° (green). A crab-like spectrum is assumed. The HAWC limits will be lower for harder sources.

atmospheric Cherenkov telescopes when the sources extent is larger than 0.25° (see Figure 5) and for energies above ∼10 TeV. The brighter HESS detected sources tend to be of larger extent than the dimmer sources pointing to the likelihood of more extended objects. With HAWC sensitivity at high energies, we will probe the knee of the cosmic ray spectrum an-

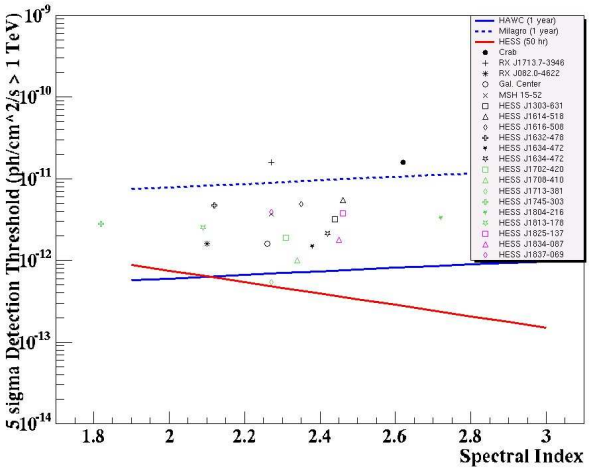


Fig. 4. Sensitivity above 1 TeV of Milagro (dotted line), HAWC (blue line parallel to Milagro's), and VERITAS or HESS (red line) versus the spectral index of the differential photon spectrum. The Milagro and HAWC observations are for 1 year and $2\pi$ sr. The VERITAS or HESS observation is for 50 hours on a single source.

swering questions about the origin and propagation of cosmic rays.

HAWC will observe many flares from AGN with the sensitivity to detect a flux of 5 times that of the Crab in just 10 minutes over the entire overhead sky. These TeV flares provide strong constraints on emission mechanisms and Lorentz invariance, plus this will also enable many multi-wavelength observations of these flares. IceCube sensitivity can be significantly enhanced by knowing the location and time of TeV gamma-ray flares which are likely to produce TeV neutrino flares, for more details refer to Goodman et al. (2007).

The HAWC sensitivity to the prompt emission from gamma-ray bursts is unique. With HAWC low energy threshold, GRBs with a TeV fluence comparable to their keV fluence will be detectable to a redshift of *sim*1, while for closer GRBs much lower fluences can be detected. HAWC sensitivity to transient phenomena will extend the field of time-domain astrophysics to TeV energies. The effective area of HAWC at 100 GeV is more than 100 times that of the Fermi-LAT.

Figure 6 demonstrates the ability of HAWC to observe shorter time scale variations than Fermi and to extend the energy range of observations beyond those of Fermi.

The HAWC deep survey of the TeV gamma-ray sky will provide an unbiased survey necessary to characterize the properties of the astrophysi-