Erratum: Observational Constraints on the Ultra-high Energy Cosmic Neutrino Flux from the Second Flight of the ANITA Experiment

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In a recent article [1] we reported a limit on the cosmic neutrino flux from the second flight of the ANITA experiment. The limit was based on observing two events passing all cuts on a background of 0.97 ± 0.42.

One of the first steps in the blind analysis procedure was inserting twelve pulser events at undisclosed random times to mimic a neutrino signal. These events would be removed upon unblinding the analysis. This was one of two ways that the analysis employed a blind analysis technique. After publication, we subsequently determined that due to a clerical error one of the two surviving events, Event 8381355, was actually one of the inserted pulser events. The fact that this event survived its subsequent scrutiny we consider as a demonstration that the blinding procedure was truly valid.

The net result is that ANITA-II observed one event on a background of 0.97 ± 0.42. The new limit, which is 33-34% stronger, is shown in in Figure 1. Now the actual limit is essentially the same as the expected limit so we no longer show both curves. The ANITA-II 90% CL integral flux limit on a pure E^{-2} spectrum for 10^{18} eV $\leq E_\nu \leq 10^{23.5}$ eV is $E_\nu^2 F_\nu \leq 1.3 \times 10^{-7}$ GeV cm^{-2} s^{-1} sr^{-1}. An updated evaluation of confidence limits for constraining representative models is given in Table I. The changes result in an improvement in the constraints on the given strong-source evolutionary models, the majority of which are now excluded at $> 90\%$ confidence.

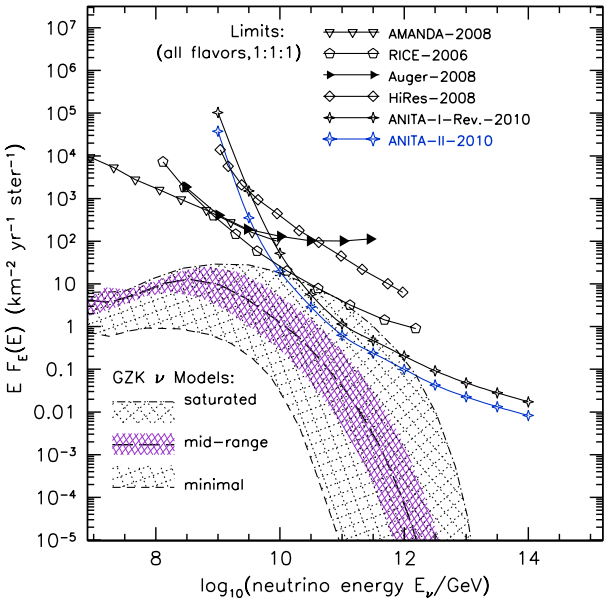

FIG. 1: ANITA-II limit for 28.5 days livetime. The blue curve is the new actual limit, based on the one surviving candidate. Other limits are from AMANDA, RICE, Auger, HiRes, and a revised limit from ANITA-I. The BZ (GZK) neutrino model range is determined by a variety of models. Full citations are given in the original article.

[1] P. Gorham et al., Physical Review D **82**, 022004 (2010).

Model & references	predicted N_ν	**CL,%**
Baseline models:		
Various	0.3-1.0	...
Strong source evolution models:		
Aramo *et al.* 2005	2.4	85
Berezinsky 2005	5.1	98
Kalashev *et al.* 2002	5.6	99
Barger, Huber, & Marfatia 2006	3.5	93
Yuksel & Kistler 2007	1.7	74
Models that saturate all bounds:		
Yoshida *et al.* 1997	30	>99.999
Kalashev *et al.* 2002	19	>99.999
Aramo *et al.* 2005	16	99.999
Waxman-Bahcall fluxes:		
Waxman, Bahcall 1999, evolved sources	1.4	...
Waxman, Bahcall 1999, standard	0.5	...

TABLE I: Expected numbers of events N_ν from several cosmogenic neutrino models, and confidence levels for exclusion by ANITA-II observations when appropriate. Citations are given in the original article.