Astrophysical Limits on Superluminal Electron and Neutrino Velocities FLOYD STECKER, NASA Goddard Space Flight Center — The observation of two PeV-scale neutrino events reported by Ice Cube allows one to place constraints on Lorentz invariance violation (LIV) in the,neutrino sector. First, I derive an upper limit for *the difference* between putative superluminal neutrino and electron velocities of $< \sim 5.6$ x 10^{-19} in units where $c = 1$. I then derive a new, strong constraint on superluminal electron velocitiy $\delta_e < 5$ x 10^{-21}. One then obtains an upper limit on the superluminal neutrino velocity *alone* of $\delta\nu < 5.6$ x 10^{-19}, many orders of magnitude better than the time-of-flight constraint from the SN1987A neutrino burst. However, if the electrons are *subluminal* the constraint on $|\delta_e| < 8$ x 10^{-17}, obtained from the Crab Nebula γ-ray spectrum, places a weaker constraint on superluminal neutrino velocity of $< 8 \times 10^{-17}$.

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