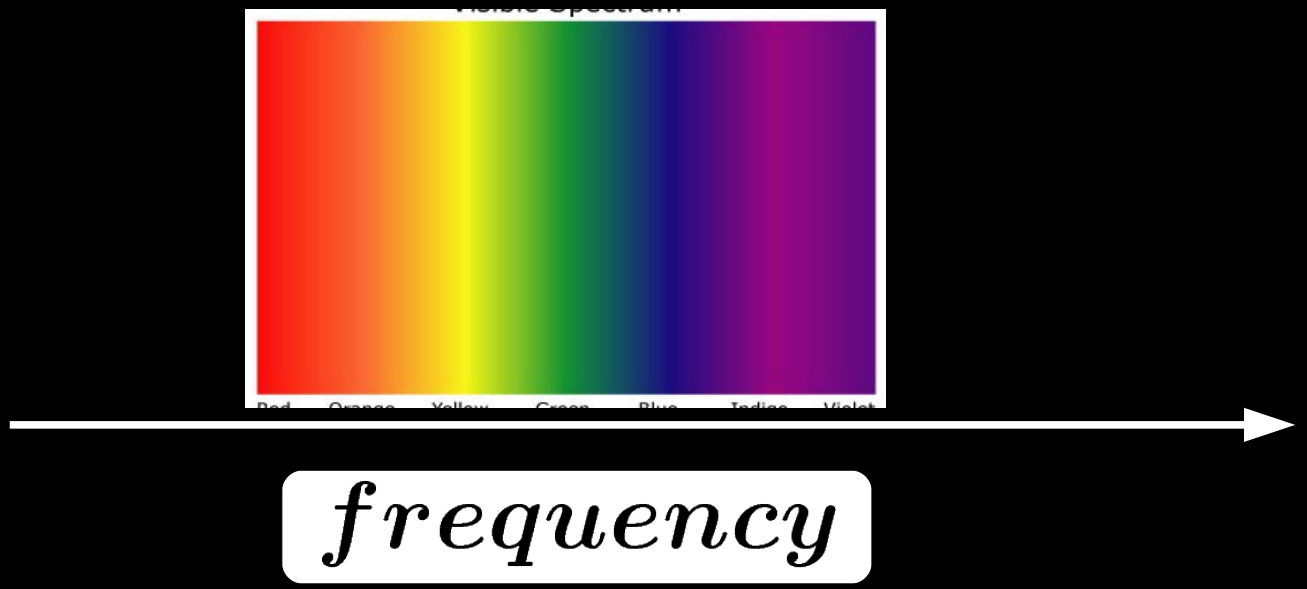
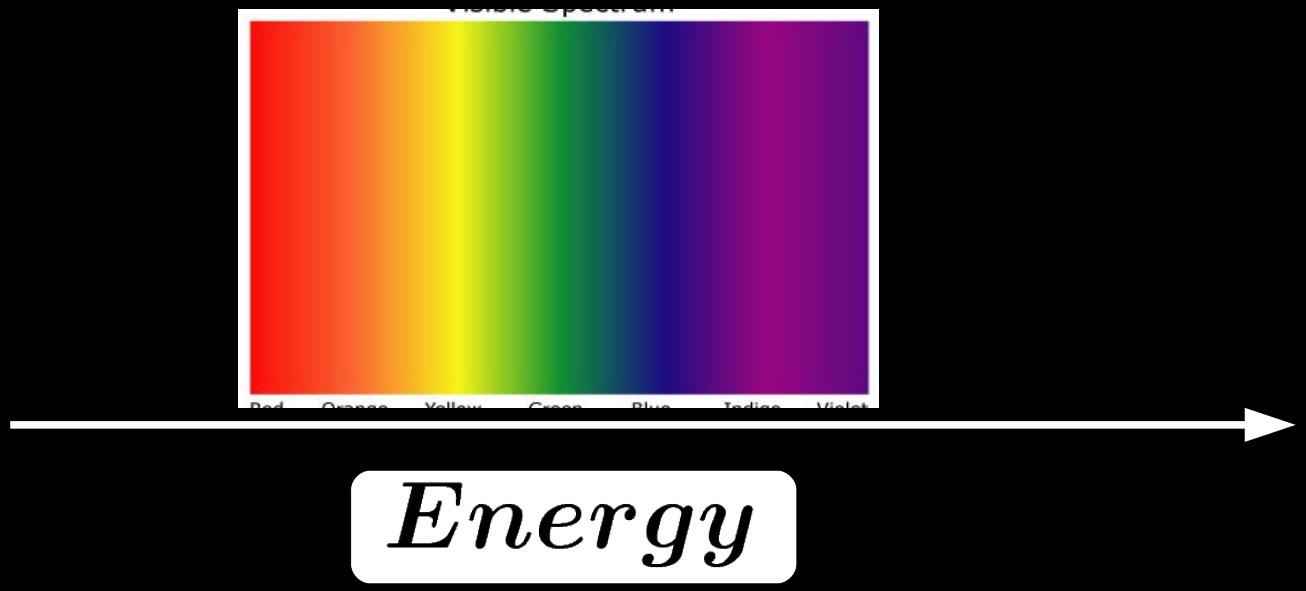
Seeing The Invisible

Visible Light



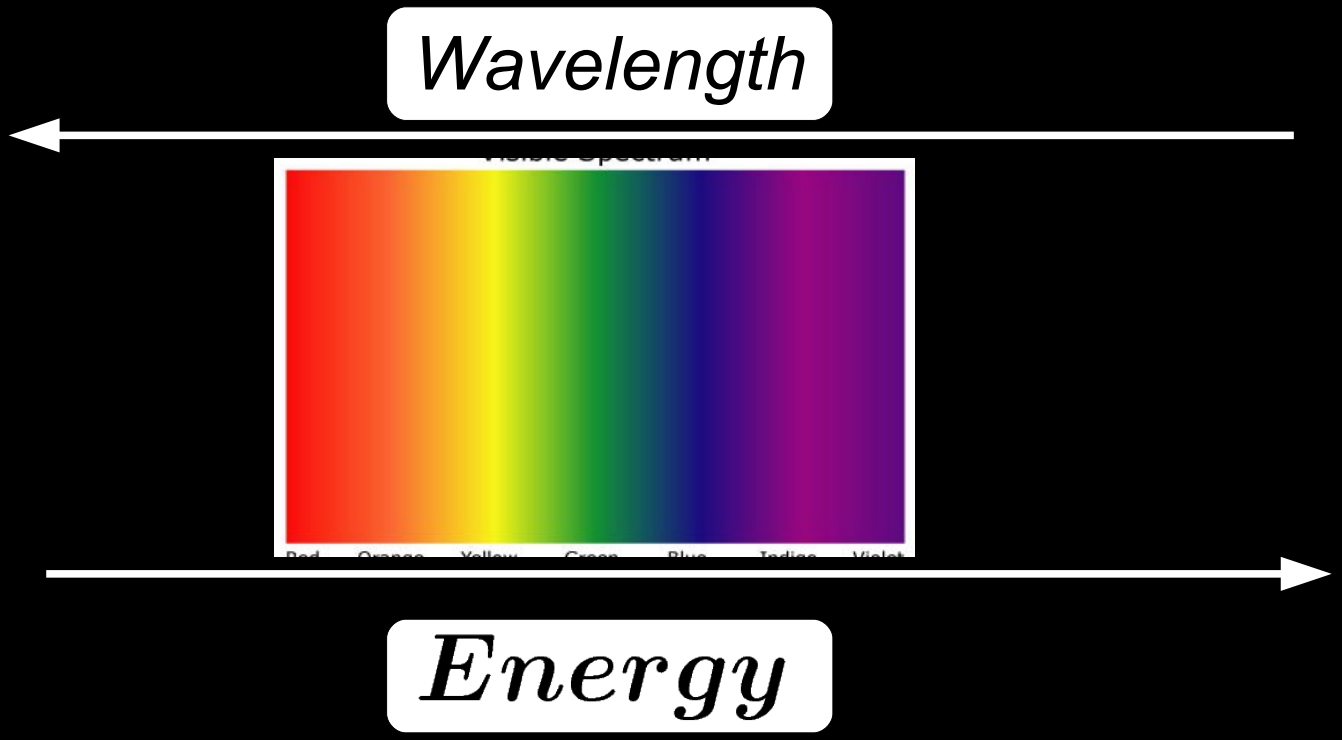
(Old Language)

Optical Photons



(Modern Language)

Optical Photons



(Modern Language)

Started Long Ago.....

Isaac Newton
(~1700)

Started Long Ago.....

William Herschel (~1800)

Infrared Light

Started Long Ago.....

Johann Ritter (~1800)

Ultra Violet Light

Beyond the End Points

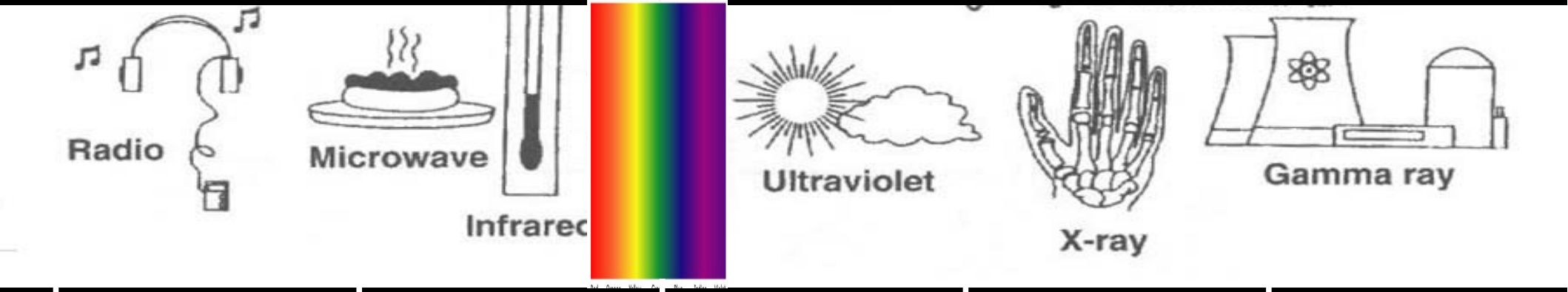
~1900s

~1900s

~1800s

~1700s

~1800s

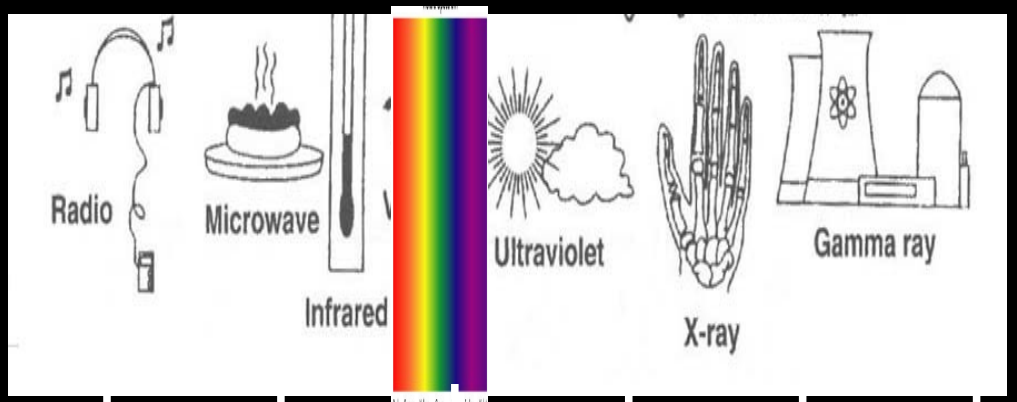


10^{-6} 10^{-3} 10^{0} 10^{3} 10^{6}

Energy [eV]

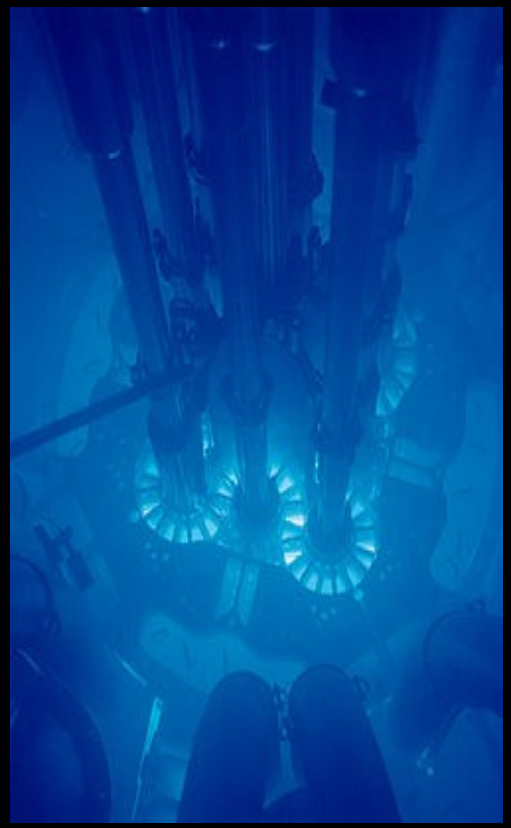
Can We Go Further?

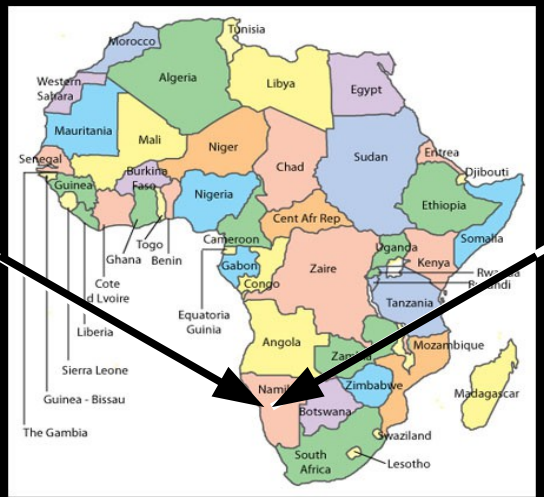
~2000s



Energy

Pushing the Limits- VHE γ-Ray Astronomy



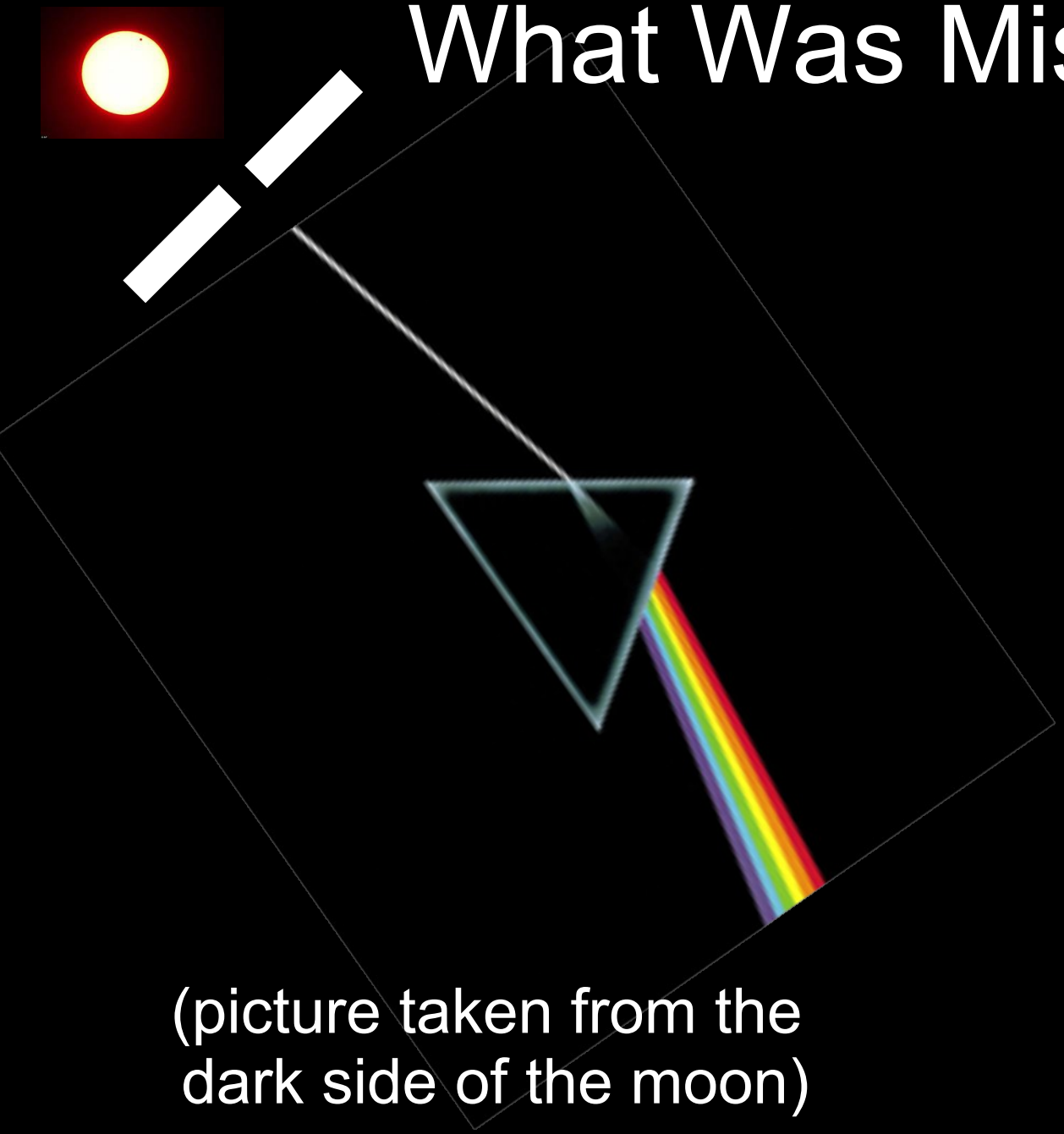


Dare We Ask....
Can We Go Further Still?

Dare We Ask....
Can We Go Further Still?

Yes....but have we missed something?

What Was Missed?



(picture taken from the dark side of the moon)

photons

$$l_{\rm int} \sim \frac{1}{n_e \sigma_{\rm T}} \sim 1\ {\rm cm}$$

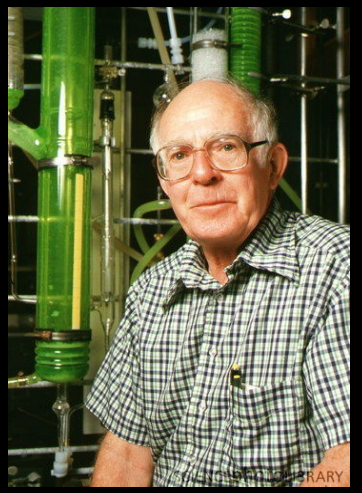
neutrinos

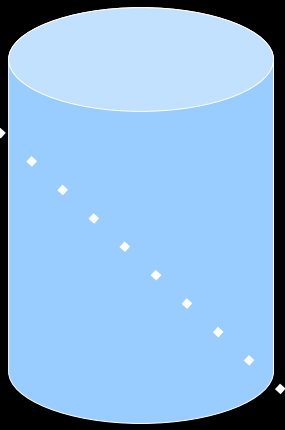
$$l_{\rm int} \sim \frac{1}{n_e \sigma} \sim 10^{15}\ {\rm m}$$

What Was Missed?

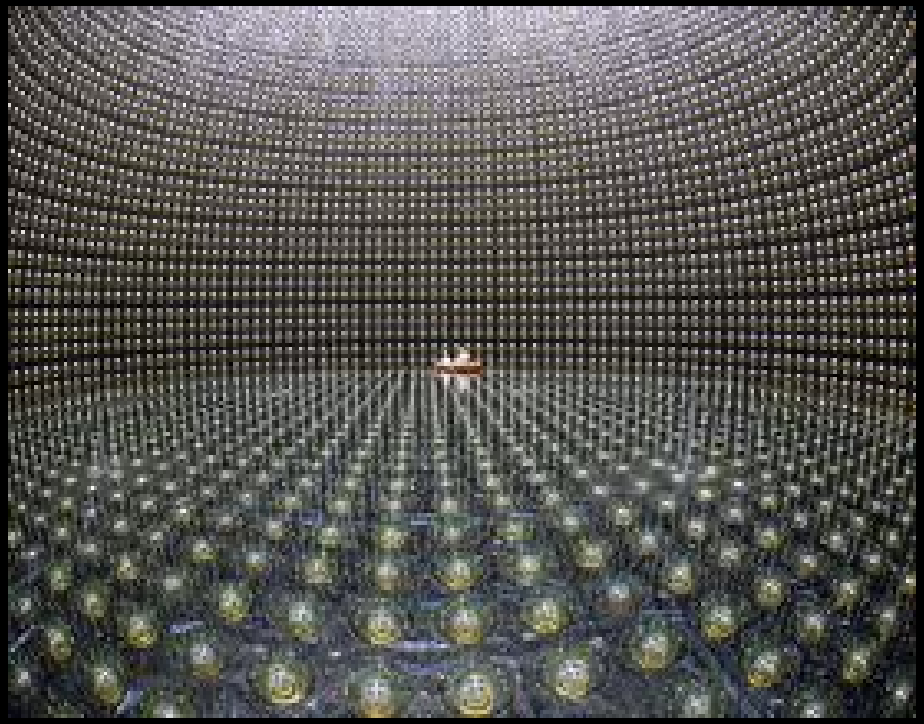
(picture taken from the dark side of the moon)

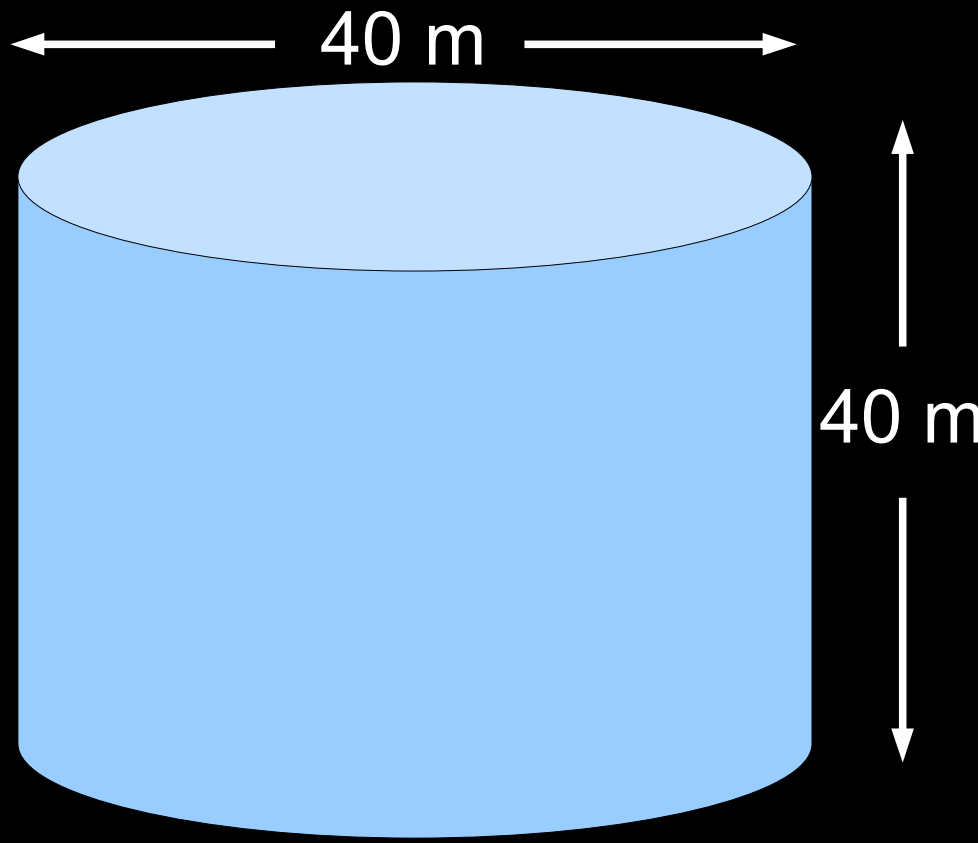
Ray Davies



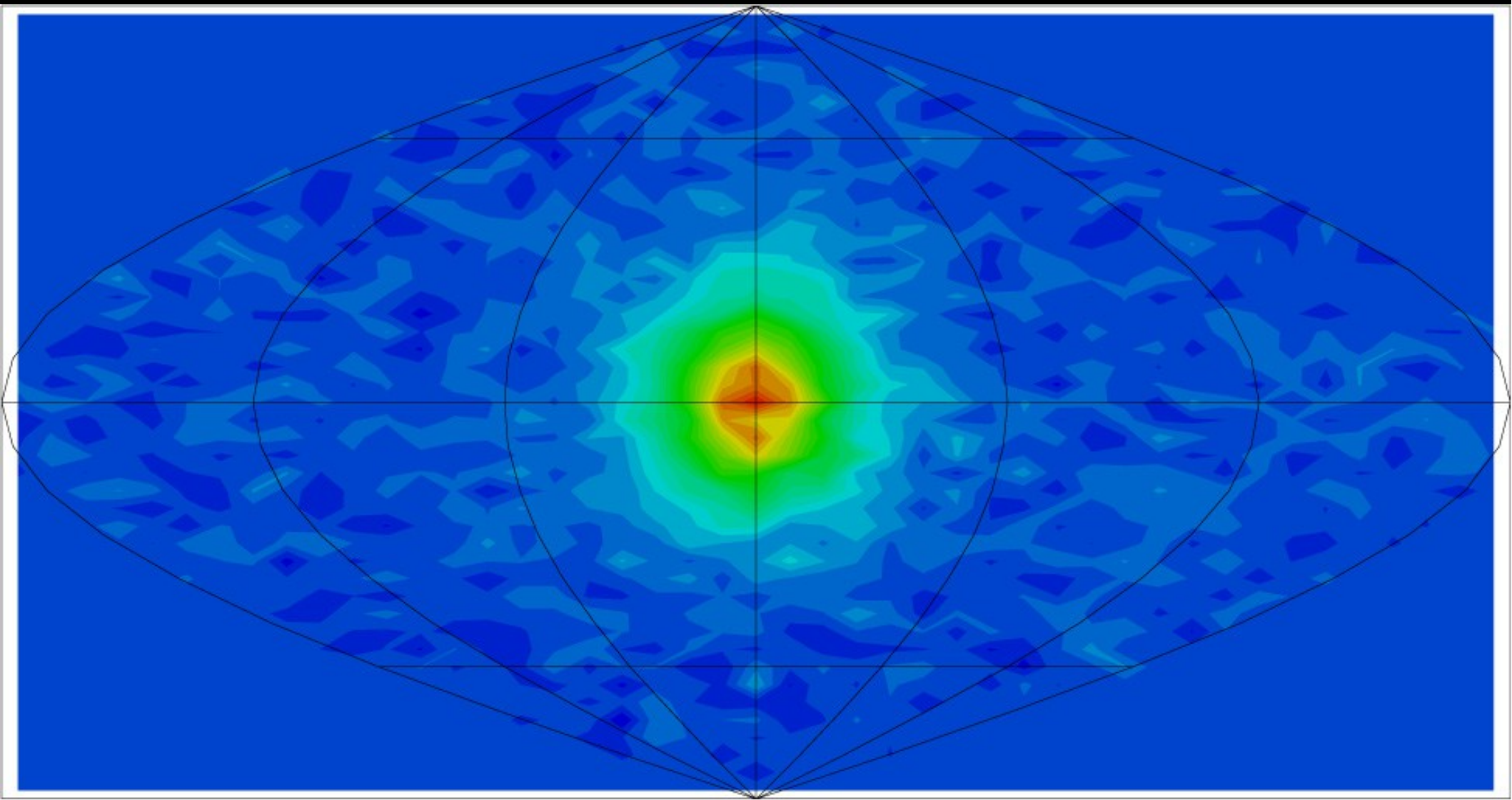


Detecting Neutrinos From the Sun

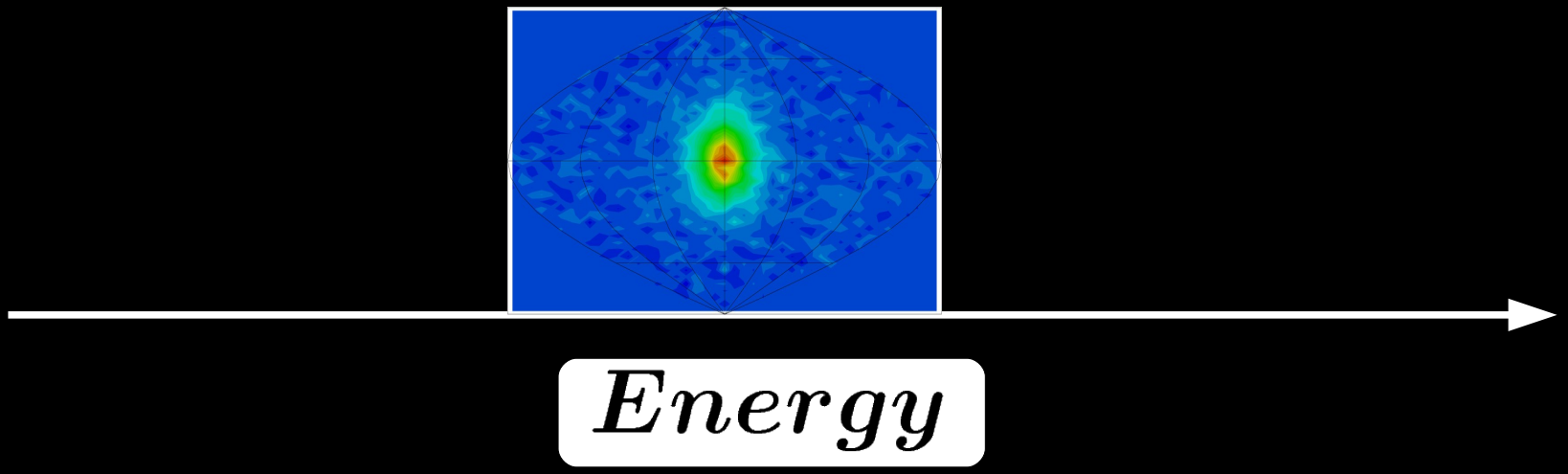




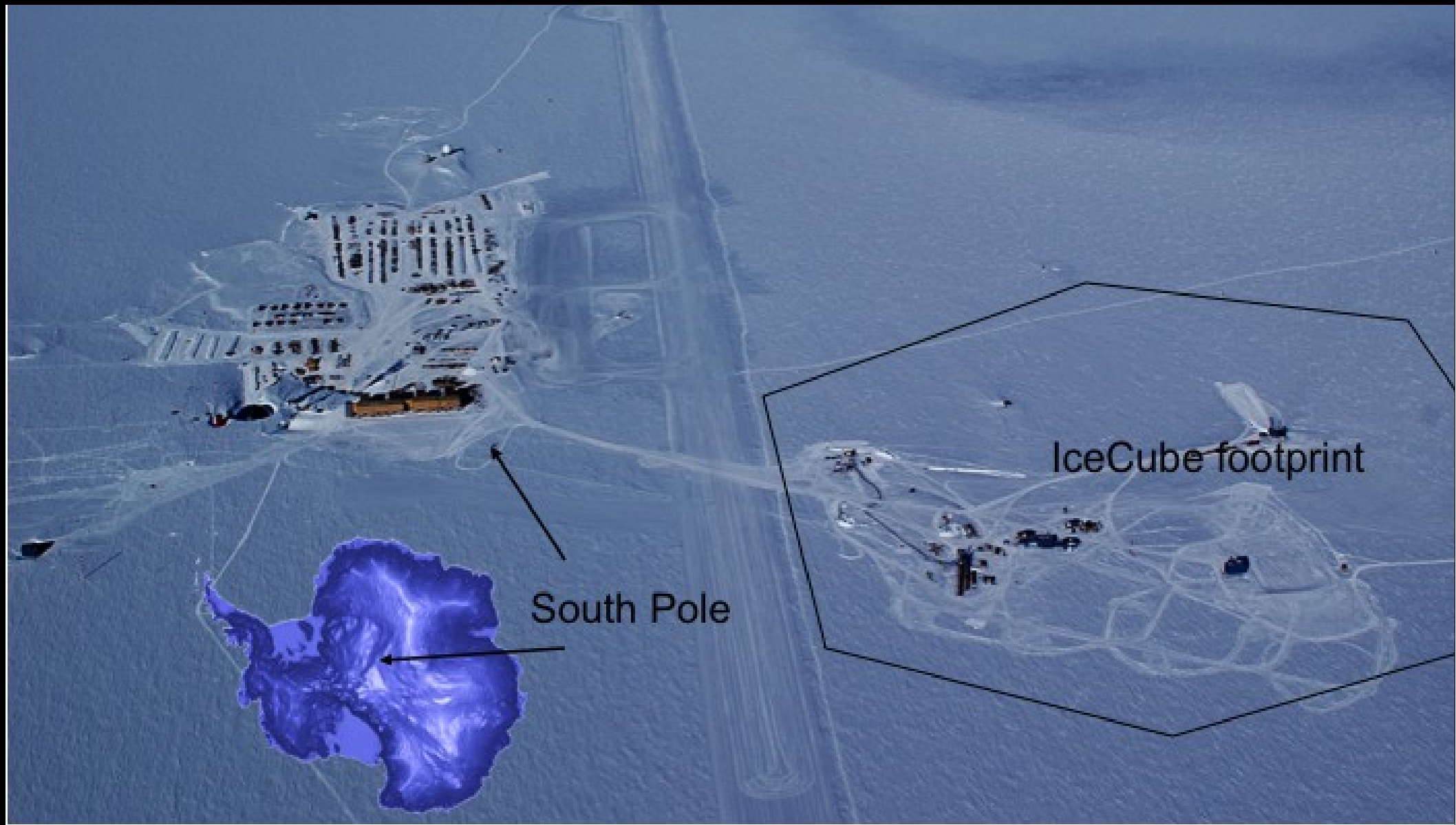
Picture of the Sun In Neutrinos!



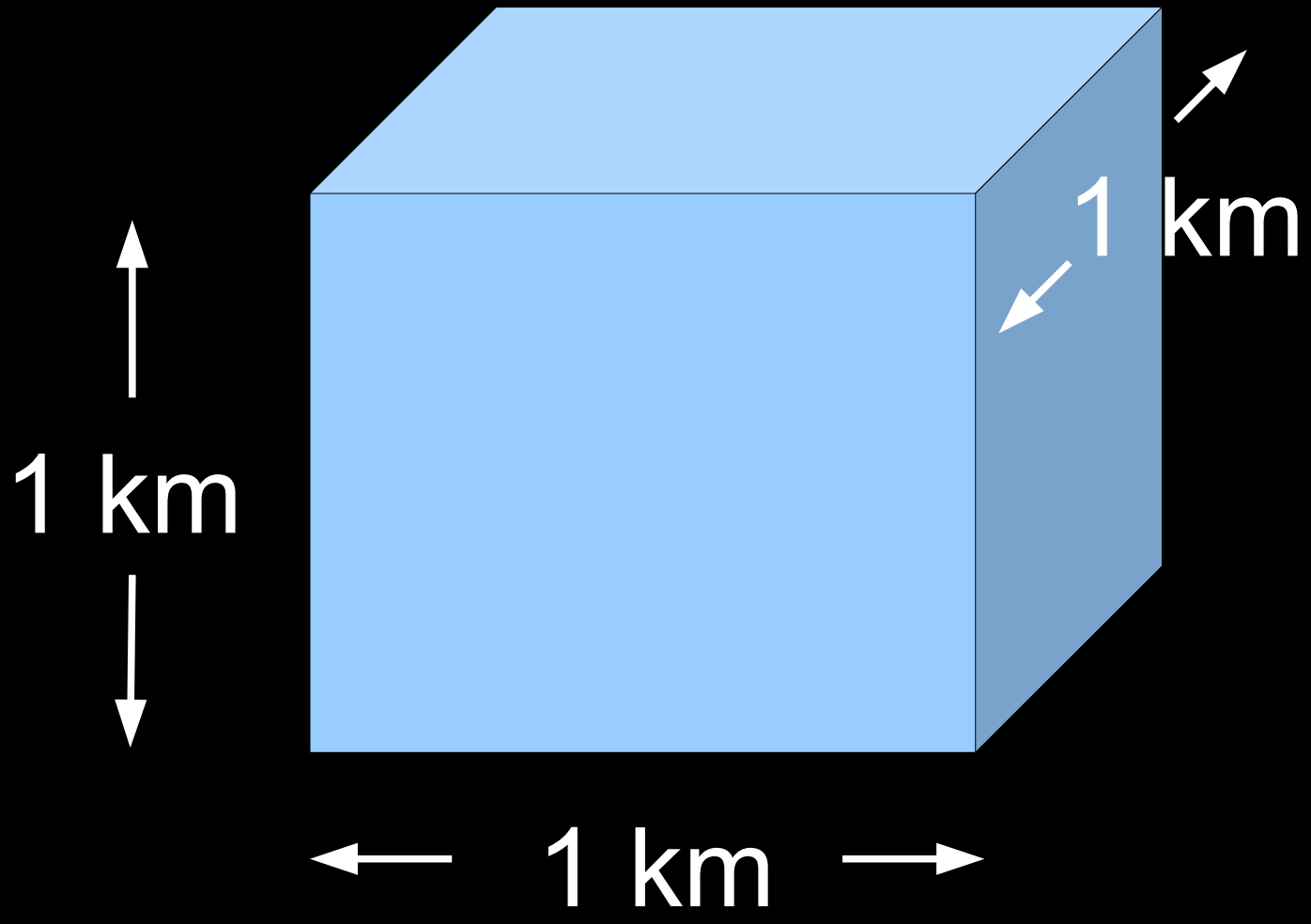
A Neutrino Spectrum?



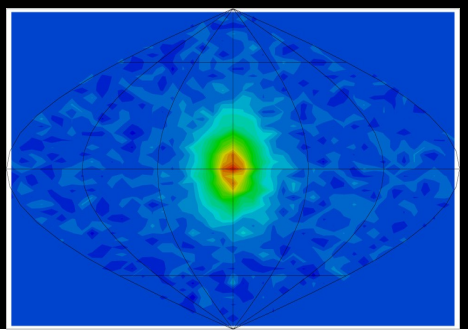
The World's Biggest Neutrino Detector

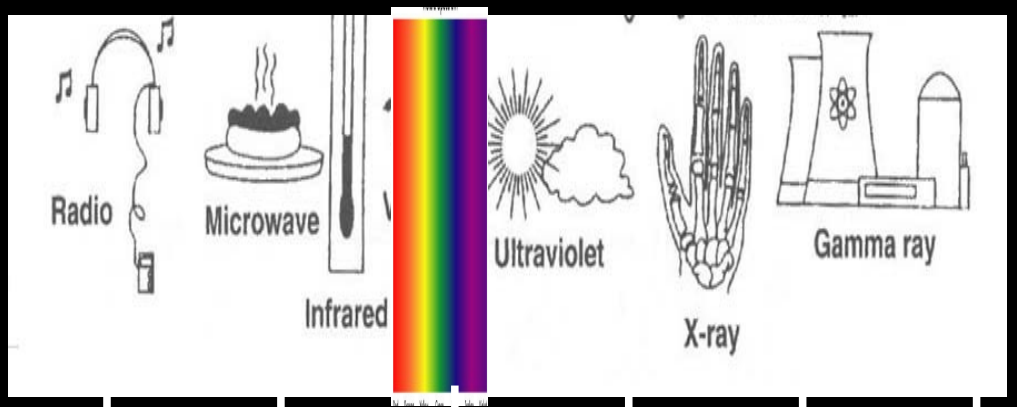


“ICECUBE”



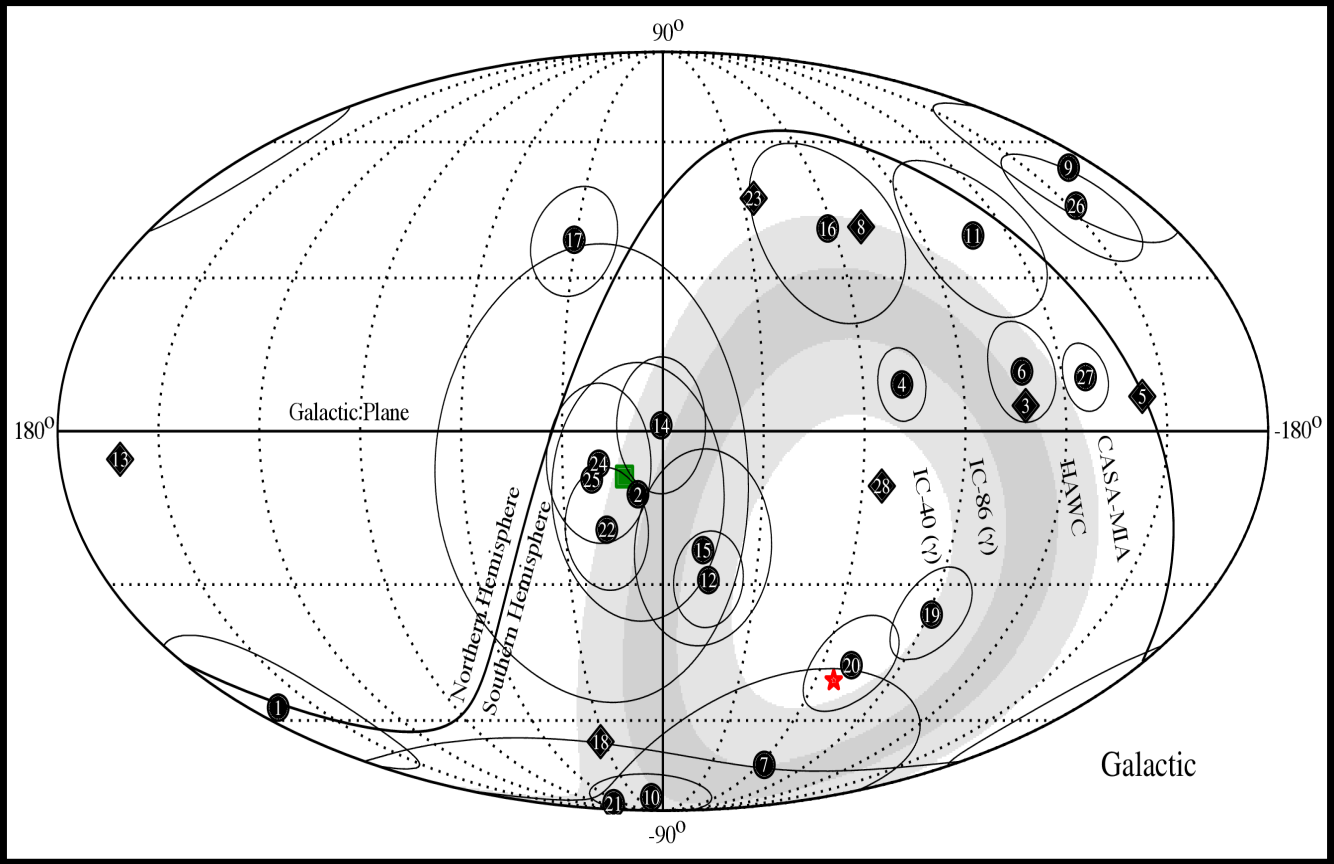
There's Still Lots More to Explore!



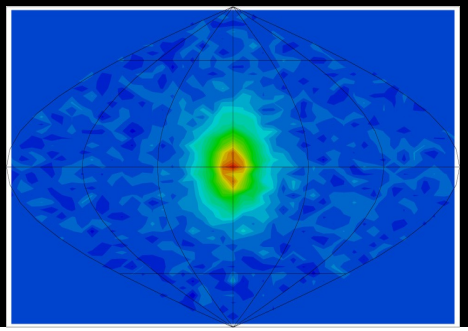


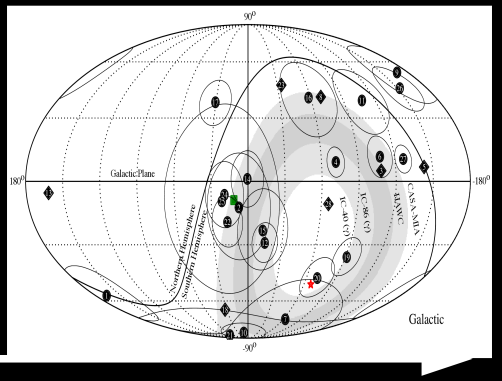
Energy

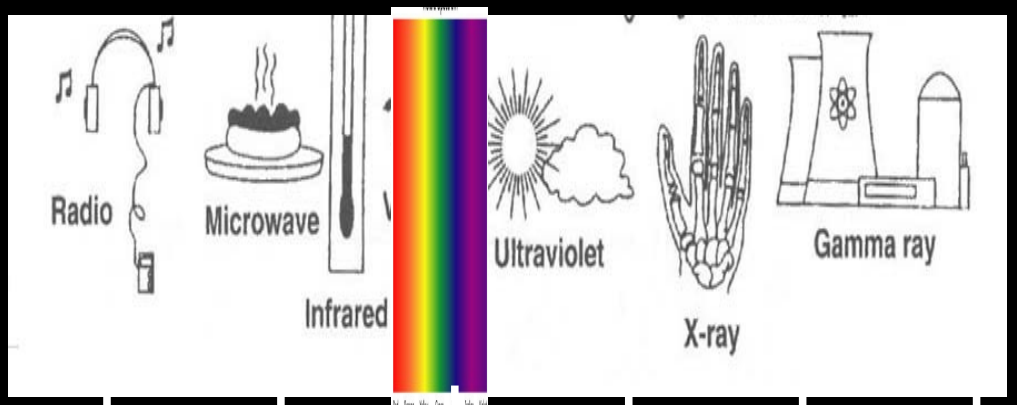
A New Discovery in Neutrinos at PeV Energies!



There's Still Lots More to Explore!







Energy

Lesson's Learnt

Investigations pushing the limits of what is known tend to turn up useful discoveries

Modern Astronomy employs the full multitude of wavelengths of light (photon energies) discovered

Photons are not the only kid on the block.....they're just more extravert. The more introverted neutrinos almost certainly hold new secrets to tell us