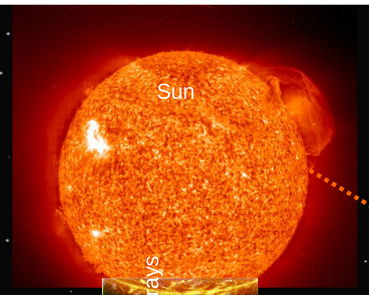
Many billions enter your body every second

Nu & You

And just pass straight through!



What's Nu?

ν (nu) is the symbol for the smallest known fundamental particle, the neutrino. The particles are at least a million times lighter than the electron and electrically neutral. This makes it very hard for them to interact with other matter. They come in 3 "flavours": electron, mu and tau. Scientists are fascinated by neutrinos because so little is known about them. Huge experiments all over the World are being built to look at the tiny particles and to find out what they can do for you.
But there are probably two questions you want answering first:

Where do neutrinos come from?

Neutrinos arriving on Earth mainly come from fusion reactions in the Sun. Other useful sources include particle interactions in the upper atmosphere, nuclear reactors, bespoke particle accelerators, other stars (especially supernovae) and even the Earth's core!

Are neutrinos dangerous?

No. They so rarely interact that they cannot be dangerous. So even though the flux from the Sun is so high, neutrinos do not hit anything so do no damage.

Science Fiction

Glamorous work at the knowledge frontier has always inspired people to think to the future and imagine how new discoveries could change society. Early work on electricity inspired work like "Frankenstein's Monster".

New Inventions

We need to know more about neutrinos and their reactions before we can invent new machines to harness their power.

Who knew what the study of electrons at the beginning of the last century would yield? Yet today, it is hard to imagine a life without televisions, radios and other electronics. Spin-offs from the Apollo Program (Moon landings) include many new machines and materials, such as Teflon. What will be "in it for the housewife" from neutrino applications?

It's not just manufacturing that relies on new scientific developments for economic growth. The mathematical and statistical analysis tools developed for scientific experiments are increasingly finding applications in banking, insurance and financial analysis. Particle physics experiments at CERN in Geneva developed the world-wide web used by millions of people just 10 years later.

Military Applications

Neutrinos have been suggested as a way to neutralise the radio-active cores of nuclear weapons. An intense neutrino beam could cause controllable nuclear decays rendering the weapons harmless.
Neutrino detectors can also be used to detect nuclear reactions from power stations at distances up-to 300 km.
Could more efficient detectors be used to track nuclear submarines?

Astronomy

Neutrino "telescopes" can be used to study supernovae and the Sun.
Experiments have already measured the flux and flavour composition of neutrinos from the Sun and have confirmed models of nuclear fusion in the Sun.
Much can be learnt about the death of stars by looking at the neutrino bursts of supernovae. Neutrinos are especially useful as they travel faster than light through the inter-stellar medium.
Experiments in Antarctica also have spin-offs for Moon-base expeditions because of their remote and inhospitable locations.

Study of Earth's Core

"Geo-neutrinos" can measure elemental abundances in the centre of the Earth, e.g. Uranium.
This can help us to understand processes such as how the Earth's magnetic field changes.

Philip Symes, University of Sussex, 2005. Sun image courtesy of NASA.