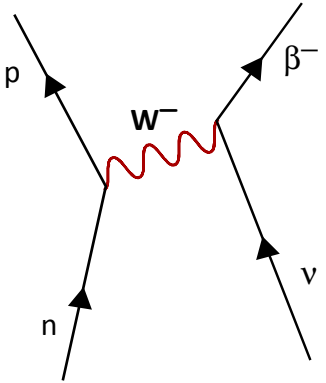
1.5 How Particles Interact – further interactions

Interactions of Neutrinos

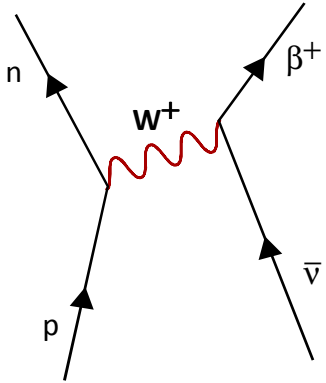
Neutrinos and antineutrinos interact very weakly with other particles. This is why billions of them can pass through the Earth every second.

Because they are leptons and have no charge, they only interact via the weak nuclear force.

A neutrino can interact with a neutron and cause it to change into a proton.

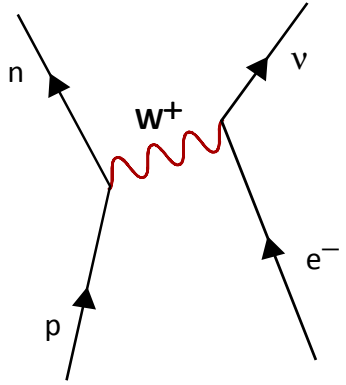


An antineutrino can interact with a proton and cause it to change into a neutron.



Electron Capture

This can occur in proton-rich nuclei. A proton in the nucleus interacts **via the weak interaction**, (not via the electromagnetic interaction), with one of the close electrons surrounding the nucleus, (an "inner-shell" electron).
The W^+ boson changes the electron into a neutrino.



Note: Although a beta particle is just a high-energy electron, we use different symbols for an electron (e^-) and a beta particle (β^-). Similarly, we use e^+ for a positron and β^+ for a beta plus particle.