

further through the use of a safety device, such as a fuse or fusible link.

As previously mentioned, current is generated whenever an electron moves from one atom to another. Each atom contains a balanced amount of electrons (negatively charged) and protons (positively charged). Hence the atom is neutral and balanced. The amount of positive and negative charges in each atom is determined by the type of element of which it is a part. For example, some compounds (a combination of elements), such as metals, have a lesser amount of electrons and protons than others.

The construction of an atom is based on magnetism. Because the fundamentals of magnetism state that opposites attract, the protons which are located in the center or nucleus of the atom hold the electrons in orbit around the nucleus.

But, how does more than one proton stay within the nucleus since the fundamentals of magnetism also state that like charges will repel each other? Multiple protons are able to stay within the nucleus because the nucleus also contains neutrally charged particles called neutrons. The number of neutrons equals the number of protons and the balance keeps them separated so they don't repel each other.

The orbits of an electron are commonly referred to as rings and each ring is limited to the amount of electrons it can hold, based on its position in relation to the nucleus. For example, the first ring around an atom's nucleus is capable of holding two electrons, the second ring can hold eight, and each ring thereafter can hold up to 32 electrons provided that it is an inner ring—that is as long as there is one more ring beyond it. These rings

are classified by assigned letters which are based on the periodic table of elements.

But for our purposes, we are only concerned with the outermost ring which is called the valence ring. The valence ring has a maximum capacity of eight electrons. We are primarily interested in this ring because this is the ring where the electrons move from atom to atom. For example, when voltage is applied to a wire, an electron is forced to jump from one atom to the next one ahead of it in line.

Once an electron moves, the atom which lost an electron is now unbalanced. The unbalanced atom is now positively biased since it has more protons than electrons. The atom wants to become balanced again, so it quickly tries to replace the lost electron. Since there is no well or supply of electrons, the only source of electrons is the atom immediately behind it in line, thus it uses its positive bias to steal an electron away from the preceding atom. This process creates a chain-reaction and will repeat itself over and over again for as long as there is another atom in line from which to steal an electron. But, if the positively biased atom is the last in line, such as at the end of an open connector or wire, the process will stop and the flow will not occur. Therefore, in order for the flow to occur, the wires containing the atoms must be part of a closed loop.

As we mentioned previously, some elements conduct or transfer electricity better than others. For example, in Star Wars, the Jedi could tell whether a person had the ability to be trained to use the force simply by 'sensing' their inner strength. In our universe, an atom's inner strength, specifically the number of electrons in its valence ring, determines how receptive an element is to conducting the