Ac and dc voltage

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The initials AC/DC might bring to mind a certain famous rock band, but in the land of physics, these abbreviations refer to alternating current and direct current respectively.

Alternating current, or AC, is current that oscillates and changes direction at a certain frequency. Frequency is the number of oscillations per second and is measured in units of hertz (Hz), where 1 Hz = 1s-1.

You can imagine the free electrons in a wire moving back and forth, oscillating around a single fixed point. This is what happens with AC current. You might wonder if this oscillation would produce noticeable effects in the objects it is used to power because if the current is oscillating, then it is periodically zero for a brief moment before it changes direction. But the oscillation frequency is usually high enough that these effects are imperceptible.

This is the type of current that typically flows in any circuit connected to a battery. That"s because batteries are designed in such a way that permits only the flow of electrons in a single direction from their anode (negative terminal) to their cathode (positive terminal) via a conducting wire (as opposed to flowing through the battery itself, in the opposite direction).

In the United States in the late 1880s, Thomas Edison and George Westinghouse fought over which was better: AC or DC. Edison had developed direct current, and it was the standard used during the early days with low-voltage circuits powering lights in houses.

High-voltage AC power, meanwhile, was powering street lamps. When George Westinghouse"s company developed a way to step down high AC voltages using transformers for household use, fierce competition ensued.

Ultimately AC won out due to the ability to transmit over long distances without loss, AC"s greater efficiency and the fact that it is much easier to step down voltages when working with AC than it is with DC.

AC can be converted to DC using a rectifier, and DC can be converted to AC using an inverter. Generally speaking, a rectifier is a simpler circuit whereas an inverter tends to be more complicated to build. This is another reason the source of electricity your home is connected to is AC and not DC.

In both cases, a voltage source initiates current flows in the circuits. It is also possible to convert from one type of current to the other, though going from AC to DC is generally considered easier.

AC and DC currents are generated differently. DC is generated from batteries and DC generators, while AC is generated from AC generators and electrical power plants, which convert mechanical energy into AC power

more readily than they would DC power because these generators typically rely on circular or oscillatory motion that directly induces alternating current.

AC and DC currents have different uses as well. Everything hooked up "to the grid" is running on AC, whereas battery-operated devices such as your phone or power tools operate on DC.

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