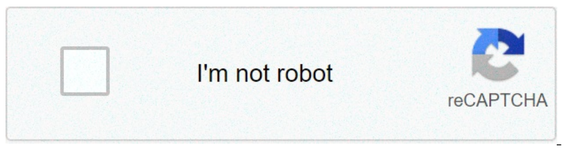

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Electric field from line of charge

Any electric car that uses batteries needs a charging system to recharge the batteries. The charging system has two goals:To pump electricity into the batteries as quickly as the batteries will allowTo monitor the batteries and avoid damaging them during the charging processThe most sophisticated charging systems monitor battery voltage, current flow and battery temperature to minimize charging time. The charger sends as much current as it can without raising battery temperature too much. Less sophisticated chargers might monitor voltage or amperage only and make certain assumptions about average battery characteristics. A charger like this might apply maximum current to the batteries up through 80 percent of their capacity, and then cut the current back to some preset level for the final 20 percent to avoid overheating the batteries.Jon Mauney's electric car actually has two different charging systems. One system accepts 120-volt or 240-volt power from a normal electrical outlet. The other is the Magna-Charge inductive charging system popularized by the GM/Saturn EV-1 vehicle. Let's look at each of these systems separately.The normal household charging system has the advantage of convenience -- anywhere you can find an outlet, you can recharge. The disadvantage is charging time.A normal household 120-volt outlet typically has a 15-amp circuit breaker, meaning that the maximum amount of energy that the car can consume is approximately 1,500 watts, or 1.5 kilowatt-hours per hour. Since the battery pack in Jon's car normally needs 12 to 15 kilowatt-hours for a full recharge, it can take 10 to 12 hours to fully charge the vehicle using this technique.By using a 240-volt circuit (such as the outlet for an electric dryer), the car might be able to receive 240 volts at 30 amps, or 6.6 kilowatt-hours per hour. This arrangement allows significantly faster charging, and can fully recharge the battery pack in four to five hours.In Jon's car, the gas filler spout has been removed and replaced by a charging plug. Simply plugging into the wall with a heavy-duty extension cord starts the charging process.In this car, the charger is built into the controller. In most home-brew cars, the charger is a separate box located under the hood, or could even be a free-standing unit that is separate from the car.In the next section we'll look at the Magna-Charge system. In some haunted locations, researchers have measured magnetic fields that are stronger than normal or which exhibit unusual fluctuations. These may be localized phenomena that stem from electronic equipment or geological formations, or they may be part of the Earth's magnetic field.Some paranormal investigators think of this as proof of a supernatural presence -- the ghosts create the field. Others suggest that these fields can interact with the human brain, causing hallucinations, dizziness or other neurological symptoms. Some researchers have theorized that this is one of the reasons people report more ghostly activity at night. Because of the way the solar wind interacts with the Earth's magnetosphere, the planet's magnetic field stretches out on the side that's in darkness. Some researchers hypothesize that this expanded field interacts more strongly with people's brains.Medical researchers have also studied the effects of electrical fields on people's brains. Electrical stimulation to the angular gyrus of the brain, for example, can cause the sensation of someone behind you mimicking your movements. Electrical stimulation to different parts of the brain has also caused people to hallucinate or seem to have near-death experiences.TemperatureCold spots are a common phenomenon in buildings that are thought to be haunted. People describe sudden drops in temperature or localized cold areas in an otherwise warm room. Often, researchers can trace the cold spot to a specific source, like a drafty window or a chimney. The sensation of a lower temperature can also come from reduced humidity. In Wiseman's study at Mary King's Close, the locations reported to be haunted were significantly less humid than those that were not.Low-frequency Sound WavesSeveral experiments have demonstrated that low-frequency sound waves, known as infrasound, can cause phenomena that people typically associate with ghosts. This includes feelings of nervousness and discomfort as well as a sense of a presence in the room. The sound waves may also vibrate the human eye, causing people to see things that are not there. Usually, these waves have frequencies of less than 20 Hz, so they are too low-pitched for people to actually perceive. Rather than noticing the sound itself, people notice its effects.Sometimes, researchers can locate the source of the sound. The article "The Ghost in the Machine" by Vic Tandy and Tony Lawrence describes a low-frequency standing wave originating from a fan. The sound wave disappeared after the researchers modified the fan's housing. When the wave dissipated, so did the symptoms of haunting in the building. You can learn more about infrasound at the Infrasonic site.The most skeptical researchers believe that all ghostly phenomena have rational explanations. Those who try to prove the existence of ghosts, however, claim that while some events have rational explanations, others can only be supernatural in origin. Regardless of whether ghosts are real, many people find them fascinating. This fascination has a number of likely causes, from curiosity about what happens to people after death to the comforting idea that deceased loved ones are still nearby. Ghost stories, like urban legends, can also express people's fears about the unknown and caution people about the consequences of actions.On the other hand, in its Science and Engineering Indicators report, the National Science Board (NSB) asserts that belief in the paranormal can be dangerous. According to the NSB, belief in the paranormal is a sign of reduced critical thinking skills and a reduced ability to make day-to-day decisions. However, since it's virtually impossible to prove that something does not exist, people will probably continue to believe in ghosts and haunted houses, especially since unexplained events aren't likely to go away anytime soon.Keep reading for more information on ghosts, urban legends and related topics.Related ArticlesBurks, Eddie and Gillan Cribbs. "Ghosthunter: Investigating the World of Ghosts and Spirits." Headline Book Publishing. 1995.Frood, Arran. "Ghosts 'All in the Mind.'" BBC News, May 21, 2003. Research Foundation Peter. 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Scientific American, March 2003. Vic. "Something in the Cellar." Journal of the Society for Psychical Research. Vol 74.3, No. 860.Tandy, Vic. "The Ghost in the Machine." Journal of the Society for Psychical Research. Vol. 62, No. 851."Mysteries of the Unknown: Phantom Encounters." Time-Life Books, 1988."Scientist Spooked by Ghost Study." BBC, May 19, 2005. Richard, et. Al. "An Investigation into Alleged 'Hauntings.'" British Journal of Psychology, 2003. Electricity and Magnetism dominate much of the world around us – from the most fundamental processes in nature to cutting edge electronic devices. Electric and magnet fields arise from charged particles. Charged particles also feel forces in electric and magnetic fields. Maxwell's equations, in addition to describing this behavior, also describes electromagnetic radiation. In this course, we focus on magnetic fields and forces on charged particles in magnetic fields. We examine different ways of calculating the magnetic field, as well as introducing the ideas of current, resistance and simple direct current (DC) circuits. This is the second module in a series of three that are based on the MIT course: 8.02, Electricity and Magnetism, a required introductory physics class for all MIT undergraduates, which is being offered as an XSeries. Please visit to learn Introductory Electricity and Magnetism XSeries Program Page for more information and to enroll in all three modules. This introductory Electromagnetism physics course will require the use of calculus. What constitutes simple DC circuits How charged particles move in magnetic fields What creates magnetic fields How to calculate magnetic field strength and direction How magnetic dipoles work and how to measure them Receive an instructor-signed certificate with the institution's logo to verify your achievement and increase your job prospectsAdd the certificate to your CV or resume, or post it directly on LinkedInGive yourself an additional incentive to complete the courseedX, a non-profit, relies on verified certificates to help fund free education for everyone globallyUnfortunately, learners residing in one or more of the following countries or regions will not be able to register for this course: Iran, Cuba and the Crimea region of Ukraine. While edX has sought licenses from the U.S. Office of Foreign Assets Control (OFAC) to offer our courses to learners in these countries and regions, the licenses we have received are not broad enough to allow us to offer this course in all locations. edX truly regrets that U.S. sanctions prevent us from offering all of our courses to everyone, no matter where they live. Looks like we released our electric vehicle charger slideshow just a little bit too soon. Autobloggreen reports that a wireless charge station may be released sometime in the next few years courtesy of Evatran, a mysterious startup with the tagline "Energy without limits."Evatran's Plugless Power charging station, unveiled this week at the Plug-In 2010 Conference, consists of a a permanently mounted car adapter along with a fixed parking block and control tower. An adopter-equipped vehicle need only pull up to the parking space, and the parking block automatically begins charging. Evatran explains the technology behind the station:Plugless Power electric vehicle supply equipment (EVSE) connects the on-board EV battery charger inductively to the electrical power source. Simply put, the two halves of the electric transformer are separated–one installed on the vehicle and one installed on the floor of a garage or parking space. When the two pieces are brought together, electrical current flowing in the parking block from the electrical grid causes current to flow into the vehicle adapter, thereby charging the battery. With the Plugless Power dual-component EVSE, current flows from one source to another without using a plug and a cord, enabling "hands-free" charging.It all sounds plausible enough, but the technology isn't quite ready for prime time yet. The first version of Evatran's charger, set to be released this December, uses a cord. Evatran hopes to have a wireless version ready in April 2011, at which point customers who have shelled out the $3,000 for the cord charger can upgrade for another $800.There's just one problem: the Plugless Power station doesn't always work. According to Evatran, the charger will be about 90% effective, which means that the other 10% of energy released is wasted. Still, it's a start. And just imagine how much easier EV charging will be when we don't have to think about it. Ariel Schwartz can be reached on Twitter or by email. By this point, the act of plugging your phone in for a charge at night is about as mundane as brushing your teeth or showering… but what would you do if nothing came out the other side of the outlet? Our phones are only as good as the batteries they have installed in the back, so learning how to keep them alive and kicking without a reliable source of power is imperative for anyone in an emergency situation or otherwise. Whether it's a natural disaster or just another day on the hiking trail, these are a few of the best ways to keep your phone alive after the power goes out. The PocketSocket Living up to its name, the PocketSocket is about as simple as personal power generators come. The charger features a standard 12v outlet, into which you can plug any device through a USB charger or AC converter. Once jacked in, you just crank away at the handle, and watch as your battery slowly climbs up the bar and out of the red. Though the actual rate of power does vary depending on the device you're trying to keep alive, overall the average boost you can expect is about one minute of cranking to one percent of battery while the device is still on. Turned off, this statistic boosts a bit more, to about 1.5 percent per one hundred rotations. RELATED: The Complete Guide to Buying an External Battery Pack Admittedly this doesn't sound like much, which is why the PocketSocket is recommended for emergency situations only. If you find yourself stranded on the side of the road with no power left and a totaled car, the PocketSocket can give you just enough time to get an emergency service on the line and out to your location. The K-Tor PocketSocket 2 sells for $64.95 from the company's website. The SivaCycle Atom What about those long bike rides, where you're out enjoying a sunny day on the street, but the music streaming into your headphones is chewing up battery life faster than your phone can keep up? That's where the SivaCycle Atom comes in. The Atom is a small, human-powered generator that works by hooking onto the gearset of your bike, and by harnessing the movement of your wheels, charges a small battery pack that can be used to bring your portable devices from dead to daylight in just a matter of minutes. The Atom differentiates itself from other bike-based charging solutions with its extension that allows you stay plugged in while you're on the road, so you never use more power than you have to while you're still in motion. For anyone who commutes to or from their work on a bike and needs to stay connected at all times, this device is the ultimate in keeping your devices happy and full of juice no matter where you go. The only drawback for the Atom is the relatively small capacity of its portable battery pack, which rates at just 1650mAh. In layman's, this amounts to about 15 percent of a charge on an iPhone 6. But even so, while that may not sound like much, in a pinch it's still better than nothing at all. The SivaCycle Atom is one of the pricier solutions here, but considering that you get a portable battery pack and the entire bike kit for $129.99, the tradeoff is more than worth the extra bump in cost. The Levin Solar Charger The Levin Solar Charger has many benefits over other solar chargers you might have seen ranking near the top of your Amazon search list. While many of those chargers boast bonuses like big batteries and wide panel footprints, none do as good of a job combining all the features we care about most. The Levin is a powerful, durable, 100 percent waterproof solar panel that can easily fit in your sidebag without any fuss and does everything we need it to for the amazingly low price of just $24.99. RELATED: How to Add a Longer-Lasting Battery to Your Smartphone Though not optimal for cloudy days lost in the wilderness, the Levin is still a solid piece of tech that belongs in any serious backpacker's toolkits. The 2.1A output from the 6000mAh onboard battery provides more than enough charge for any cellphone, and even produces enough electricity to keep tablets and laptops running long past their due date. When left out in direct sunlight for 7-8 hours of exposure, the charger will get an iPhone 6 up to about 50 percent battery on a single surge. The Levin will also hold its charge for weeks at a time, which means that you can power it up when it's convenient, and save what you need for when the going gets tough and the lights go out after a big storm. You can snag your own Levin Solar Panel in your choice of four colors, which for our money is one of the best portable sun chargers on the market today. So what should you do the next time a natural disaster strikes and you run out of battery to call friends or family members in the crisis? It turns out the best kind of power is human power, and these alternative mini-generators have got more than enough to spare. Image Credit: SivaCycle 1, 2, K-Tor, Levin