Electromagnetic Applications

Dong, Jason (School: The Advanced Education Science Center Kolmogorov Boarding School of the Moscow State University)

When most people hear the word electromagnets, they instantly think of a magnet created with electricity. This has had practical applications as strong magnets able to be turned on or off when necessary. However, not a lot of appliances focus on the magnet-to-electricity aspect of electromagnets. I investigated this aspect and created a model EMP device which doubled as a wireless charging port with a disposable camera, magnet and core wire, and a switch. After removing the flash capacitor from the camera, I wired it with the coiled magnet wire and a switch to form a device I could reliably charge and discharge to create a fluctuation of magnetic force which was able to negatively affect some weak electronic devices. For the wireless charger, I sent to a receiver coil a constant electromagnetic field created by a transmitter coil, which led to a charge in the receiver. I also created multiple versions of both devices to determine the effects of different variables on the strength of the magnets. A practical use of an EMP device can be to purposefully shut down electronics at a distance without using a built in instrument to turn it off. An application of wireless charging is already being popularized to charge personal cellular devices. Although wireless charging is currently less efficient than conventional charging, its possibilities allow for mass charging from a single transmitter coil or less physical restrictions.