

Radiation from mobiles is not killing birds.

And there is no fifth force of nature.

Sequel to Robot, 2.0 released recently. And while I didn't care much for the story of the movie, which was pretty bad itself, I was furious on how much misinformation the movie had. Unlike the first movie, 2.0 did a terrible job at separating fact from fiction. A lot of people don't do research of their own, and believe blindly in pseudoscience spread by movies like this.

There is no "Good", "Bad", or "Evil" radiation or frequency. Neither does a fifth force or aura exist.

In one of the scenes, a scientist claims that they have engineered a frequency that is "positive" so that they can broadcast it to space such that only aliens with "positive" intentions will be able to intercept it, but ones with "negative" or "evil" intentions will not. This is one of my biggest pet peeves with pseudoscience. People throw around terms like "positive and negative energy" and "auras" like they understand how any of this works. There are only 4 fundamental forces. Two of them are nuclear forces with a very short range. The other two are the Electromagnetic force and Gravity. Nave *Fundamental Forces of Nature* Urone and Hinrichs

There is no aura either. There is no evidence for it, unlike what the movie states.

Base Station operators can't just increase the frequency at which that transmit to increase data speed.

Mobile networks operate at very specific range of frequencies, and operators have to license those frequencies from the government to operate on them. For example, GSM (2G) is operated around 900MHz and 1800MHz. UMTS (3G) is operated on 900MHz and 2100MHz. LTE (4G) is operated on frequencies ranging from 850MHz to 2500MHz. WiFi also operates at 2500MHz. *Frequencies in Use Frequency Bands for 2G, 3G, 4G Mobile in India Telecom Spectrum Allocation in India* Poole These frequencies are divided into bands and channels. A telephone operator, such as airtel, cannot increase the transmission frequency to increase audio quality, data speed, or range. Because:

1. Higher frequencies might be licensed by other companies, such as vodafone, or be reserved for government use, such as Railway.
2. It would confuse mobile phones. If the frequencies are out of specification, phones wouldn't be able to connect at all.
3. Higher frequencies would end up reducing the range. High frequency signals provide better link speeds but are more easily absorbed. This is why WiFi is fast but has a very small range, where as GSM (2G) is slow but has a very long range. *5Ghz IEEE 802.11a for Interference Avoidance Propagation Losses Through Common Building Materials 2.4 GHz Vs 5 GHz*

Radiation from mobile networks is not strong enough to kill birds, neither is it giving you cancer.

As we discussed before, mobile networks use frequencies in the range of 800-2500MHz. Frequencies in this range are called radio frequencies, and are considered “Non-Ionizing Radiation”. Non-Ionizing means the radiation does not have enough energy to ionize atoms, so they can’t modify DNA, or change the chemical structure of your body. This means radio waves do not cause cancer. *Cell Phones and Cancer Risk* The movie show scenes where birds start falling out of the sky and die. In reality, birds are barely affected by the radiation from mobile networks Most harm that happens from non-ionizing radiation is caused because of its ability to heat tissue. This effect is similar to how microwaves heat your food up. Though, this effect is minimal at the range and frequencies at which mobile networks operate. The FDA measures this effect as the Specific Absorption Rate (SAR). A SAR of 2 is considered safe. Experiments have shown that, at a distance greater than 4 meters from a base station, SAR values are lower than 2. At 10 meters, they are less than 0.5. *Non-Ionizing Radiation and Radio Frequency (RF)* Kumar and Pathak *Potential Health Effects of Exposure to Electromagnetic Fields (EMF)*

Finally, most birds do not use the earth’s magnetic field to migrate. They use various mechanisms, including the direction of the sun, and local landmarks. The fields produced by mobile networks do not affect these birds. Even for birds that do use the earth’s magnetic fields, like the homing pigeons, there is no evidence that mobile networks disrupt the ability to detect magnetic fields. Gould Wallraff

Conclusion

Do not blindly believe things you see in movies, or read on the internet. Do your own research, ask experts, read some science textbooks, and most of all, use your common sense. Here are a few videos you can checkout on this topic.

- IDTIMWYTIM: Radiation - SciShow
- Do Cell Phones Cause Cancer? - SciShow
- Are My Electronics Making Me Sick? - SciShow
- Can You Be Allergic to WiFi? - Seeker

References

- 5Ghz IEEE 802.11a for Interference Avoidance.* https://www.motorolasolutions.com/content/dam/msi/docs/business/_documents/static_files/interference_tb_0809.pdf?pLibItem=1.
- Cell Phones and Cancer Risk.* National Cancer Institute, Nov. 2018, <https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/cell-phones-fact-sheet>.
- Frequencies in Use.* <https://www.frequencycheck.com/countries/india>.

- Frequency Bands for 2G, 3G, 4G Mobile in India*. 2007, <https://www.nepalitelecom.com/2017/02/frequency-bands-2g-3g-4g-mobile-india.html>.
- Fundamental Forces of Nature*. University of Chichago, <http://ecuiplib.uchicago.edu/multiwavelength-astronomy/astrophysics/03.html>.
- Gould, James L. *Magnetic Field Sensitivity in Animals*. Vol. 46, no. 1, Annual Review of Physiology, 1984, pp. 585–98, <https://doi.org/10.1146/annurev.ph.46.030184.003101>.
- Kumar, Sandeep, and P. P. Pathak. *Effect of Electromagnetic Radiation from Mobile Phones Towers on Human Body*. Indian Journal of Radio & Space Physics, July 2010, <http://nopr.niscair.res.in/bitstream/123456789/13321/1/IJRSP%2040%286%29%20340-342.pdf>.
- Nave, Carl R. *Fundamental Forces*. Georgia State University, <http://hyperphysics.phy-astr.gsu.edu/hbase/Forces/funfor.html>.
- Non-Ionizing Radiation and Radio Frequency (RF)*. Utah State University Office of Research; Graduate Studies, <https://rgs.usu.edu/ehs/non-ionizing-radiation-and-radio-frequency-rf/>.
- Poole, Ian. *IEEE 802.11 Wi-Fi Standards*. <https://radio-electronics.com/info/wireless/wi-fi/ieee-802-11-standards-tutorial.php>.
- Potential Health Effects of Exposure to Electromagnetic Fields (EMF)*. European Commission, 2015, http://ec.europa.eu/health/scientific_committees/emerging/docs/scenih_r_o_041.pdf.
- Propagation Losses Through Common Building Materials 2.4 GHz Vs 5 GHz*. Nov. 2017, https://www.am1.us/e10589_propagation_losses_2_and_5ghz/.
- Telecom Spectrum Allocation in India*. 2010, <https://www.indiatelecomonline.com/telecom-spectrum-allocation-in-india/>.
- Urone, Paul Peter, and Roger Hinrichs. *Extended Topic: The Four Basic Forces—an Introduction*. Libretext Libraries, Apr. 2018, <http://hyperphysics.phy-astr.gsu.edu/hbase/Forces/funfor.html>.
- Wallraff, Hans G. *Avian Navigation: Pigeon Homing as a Paradigm*. Springer, Berlin, Heidelberg, 2005, <https://link.springer.com/book/10.1007/b137573>.

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