

# LIGHTNING DATA CENTER MINUTES

May 10, 2024

ST. ANTHONY HOSPITAL, LAKEWOOD, COLORADO

Monthly Quote: “While successful in tabulating the destructive and fatal effects of lightning..., our weather bureau, in common with other great meteorological institutions, finds the force behind the fiery cannon balls and projectiles of Jupiter Pluvius too illusive and vagarious to be reduced to law.” The Colorado Statesman, Sept. 21, 1912.

Members present: Clark, Stemple, Langford, Swanson, Crow and Yarnell. Meeting began at 11:45 AM and ended at 12:40 PM.

1. The LDC is accepting donations, either as cash or check. If you donate via check, please make your check payable to Steve Clark at 755 S. Clinton Street, #2A; Denver, CO 80247. He will cash the check and keep the cash holdings specifically for the LDC. When the LDC incurs expenses, Steve will pay for services rendered through his bank account using the cash from LDC’s cash holdings. A log will be maintained detailing the inflow and outflow of monies. LDC currently has \$347.00 in cash.
2. We were saddened to hear of the passing of Howard Wachtel’s wife Clara. From time to time, she would attend the meetings with Howard, whether they were in-person or on Zoom. She and Howard enjoyed the company of Michael and Nancy Cherington. The LDC extends its condolences to the Wachtel family during this difficult time.
3. Following up on our March discussion of ball lightning (BL), our Russian expert on BL, Dr. Shmatov, sent me a couple of articles on the subject. One is an article in Scientific American describing an occurrence of apparent BL in Venezuela in 1886 and the other is a 1975 overview article, with accounts, theories and a BL bibliography. The Venezuela case is cited in the Lightning Links section. I have been unable to find a link for the second article.
4. I recently came across an interesting article with the following title: “Are Neurons Required for Cognition and Memory?” Traditional thinking says memory and cognition are handled strictly by neurons; however, there is evidence that plants and other non-neurons have memory and cognition. Recent research in the relatively new field of basal cognition suggests there may be other parts of our bodies that interact with our brains alongside neurons. This new knowledge has the potential to significantly change how diseases are treated and change our understanding of cognition and memory.
5. We discussed the topic of February’s meeting of getting useful information into the hands of ER physicians for patients who present with lightning injuries. The goal is to post relevant guidance on the LDC website. There was discussion about how much to include or not include in any guidance. It was decided to just post items onto the website to be curated later. Dr. Phil Yarnell suggested writing letters to the ER departments in Florida hospitals, since Florida is consistently at or near the top for lightning casualties in the US. Steve Clark will start on that.

6. Carl Swanson sent a news piece about the counties in Colorado with the highest number of injuries and fatalities from lightning. The article has a table called “Counties with most lightning-related harm” which cites data from the Colorado Lightning Resource website maintained by LDC member Steve Hodanish with the Pueblo National Weather Service Forecast Office.
7. Carl sent a second article which announced the discovery of X-Rays in upward streaming lightning flashes. X-rays have been observed in downward streaming lightning for 20 years, but they had not been detected in upward streaming lightning until recently. Researchers with the École Polytechnique Fédérale de Lausanne in Switzerland (in English, Swiss Federal Institute of Technology in Lausanne) presented 4 observations of upward flashes from the Säntis Tower, located in the Appenzell Alps in northeastern Switzerland. X-rays were detected during the step leader (upward negative leader) phase. A high-speed video camera (24,000 frames per second) captured one of the flashes. There are links to two videos in the Lightning Links section – one at regular speed and the other a YouTube video showing it in slow motion.

In the same vein, Ken Langford showed us an article on “Dark Lightning”. Computer models have suggested there is a form of extreme lightning which may generate large amounts of gamma rays, but which is not very luminous, which led scientists to coin the phrase “dark lightning”. The intensity of the gamma rays can vary from the equivalent of 10 chest x-rays at the top of a 40,000-foot thunderstorm to around 10 times higher in the middle of a thunderstorm. Passenger airplanes cruise at altitudes of around 30,000 - 40,000 feet. Most of the time, gamma ray exposure will be a non-issue as pilots avoid thunderstorms, but on some occasions, aircraft do fly into storms and people are exposed to radiation from dark lightning.

8. The LDC website was updated to replace incorrect or dead links on April 3, 2024.
9. The LDC did not meet last April due to a lack of attendance.
10. LDC welcomes your questions. Please send them via e-mail to Steve Clark at [sclarktoto@gmail.com](mailto:sclarktoto@gmail.com). Your medical questions will be forwarded to Dr. Phil Yarnell for his review and will usually be taken up for discussion in the next month’s meeting. Please be advised any questions posed are for the general consideration by the group and any answers given do not constitute a formal medical opinion. If a formal evaluation is requested, arrangements can be made directly with Dr. Yarnell. If you have a medical emergency, please call 911 or your local EMS.
11. Questions, comments, error notifications, and critiques of these minutes are welcome. Please send them to Steve Clark. Please keep the communications professional and respectful. They will be forwarded to the appropriate author(s) of the minutes and addressed accordingly.
12. LDC Disclaimer: These minutes do not represent official positions of the LDC or its members. They simply reflect the comments made at the meeting. Furthermore, the LDC does not implicitly or explicitly recommend or endorse any product or service. Any product or service presented in these minutes is done so for purposes of discussion and analysis. The merit (or lack thereof) is open for the consideration and review by the entire membership.

13. Next meeting: Friday, June 14, 2024, from 11:45 AM to 1:00 PM MST.

Respectfully Submitted,  
Steven E. Clark, Consulting Meteorologist

## Lightning Links

**This is a monthly listing of periodicals, websites, and videos about lightning and allied areas from a variety of sources. A headline or description is listed, followed by the link. Please note that some of the links are perishable, which means you'll need to go to the source for the information.**

Seeking, I., 2011: A Curious Phenomenon in Venezuela – Scientific American; Dec 18<sup>th</sup>, 1886 (Discussion Forum). *Physicsforums.com*. April 20, 2011. A scan of the article from SA is embedded in this discussion thread. Link: <https://www.physicsforums.com/threads/a-curious-phenomenon-in-venezuela-scientific-american-dec-18th-1886.492074/>

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Haseltine, E., 2024: Are Neurons Required for Cognition and Memory? *Psychology Today*. April 1, 2024. Link: <https://www.psychologytoday.com/us/blog/long-fuse-big-bang/202404/are-neurons-required-for-cognition-and-memory>

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Starr, M., 2024: Scientists Measure X-Rays from Particularly Dangerous Upward Lightning for First Time. *Science Alert*. May 1, 2024. Link: <https://www.sciencealert.com/scientists-measure-x-rays-from-particularly-dangerous-upward-lightning-for-first-time>  
Shows flash at regular speed.

YouTube Video: Scientists Measure X-Rays From Particularly Dangerous Upward Lightning For First Time. Wonder World., May 1, 2024. Link: <https://www.youtube.com/watch?v=GHwCiYN8ntk>  
Shows flash in slow motion multiple times and provides more information about the discovery.

Oregal-Chaumont, T., A. Sunjerga, P. Hettiarachchi, V. Cooray, M. Rubinstein and F. Rachidi, 2024: Direct Observations of X-Rays Produced by Upward Positive Lightning. *Scientific Reports*, April 6, 2024. Link: <https://www.nature.com/articles/s41598-024-58520-x>

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Choi, C., 2013: 'Dark Lightning' Zaps Airline Passengers with Radiation. *Live Science*. April 10, 2013. Link: <https://www.livescience.com/28594-dark-lightning-zaps-airline-passengers.html>

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Rhodes, M., 2024: Counties in Colorado with the Highest Injuries, Deaths from Lightning Strikes. *KDVR-TV*. April 26, 2024. Link: <https://kdvr.com/news/local/counties-in-colorado-with-the-highest-injuries-deaths-due-to-lightning-strikes/>

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