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Lightning strike
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Researchers Trigger Lightning with Laser Beam

Man-made lightnings receive upgrade

During an experiment carried out in South Baldy Peak, New Mexico, European researchers using a high-power laser deliberately triggered electrical activity in two passing thunderstorms. Laser pulses created plasma filaments inside the clouds, through which electric current was discharged inside the clouds. However, no air-to-cloud lightning was created, because the plasma filaments produced by the laser were too short-lived to trigger such a discharge. "This was an important first step toward triggering lightning strikes with laser beams. It was the first time we generated lightning precursors in a thundercloud," said Jérôme Kasparian from the University of Lyon. To create a fully developed lightning discharge, the team would have to reconfigure the laser system so that the laser beams be fired in a sequence that would make longer-lived filaments. Lightning strikes allow scientists not only to determine the mechanism through which they are produced, but also to test lightning sensitive instruments on board airplanes and the infrastructure used in power lines. Pulsed laser beams trigger lightning by ionizing molecules in the air, practically turning them into a plasma gas that acts very similar to a conductor. More traditional approaches to trigger lightning strikes into desired areas involve shooting into the cloud small missiles attached to the target through a small conductor wire. However, three decades ago researchers started developing a mean through which laser beams could be used to accomplish the same task. Until now, no experiment was able to produce a long-enough plasma channel to affect the electrical activity inside clouds, albeit the new generation of lasers developed by the Teramobile project may soon change that. The mobile laser system is capable of creating long plasma channels inside clouds by firing ultra short laser pulses. Measurements before and after the experiment revealed that the laser system was able to increase the electrical activity inside the cloud, in the general direction where the beam was pointed, thus determining local electrical discharges. Because the plasma channels were too short, the electrical discharge was only able to travel a few meters before dissipating. The team believes that, by increasing the laser pulses by a factor of 10, they would be able to create longer plasma channels, in order to trigger air-to-ground electrical discharges. Lightning triggering rockets are only 50 percent efficient and require a lot of time and money to operate. By using a laser system, the process could become much faster, cheaper and could be used for a series of applications which cannot be carried out with the current technology.