

Campus News - January 29, 2001

UNM researchers use lasers to guide lightning

(Department of Physics & Astronomy)...In 1752 Benjamin Franklin used a kite to prove that lightning is really a stream of electrified air. In 2001 researchers at UNM are working with lasers to guide and control lightning.

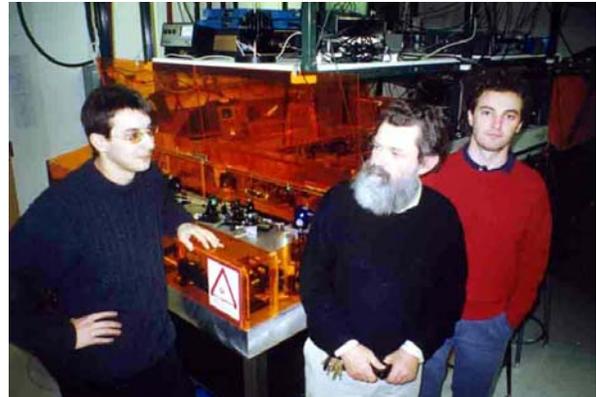
The purpose of the project is to guide lightning and direct it away from people, buildings and aircraft. The idea is to help industry, government and other agencies save money from damages caused by lightning.

Jean-Claude Diels, Physics & Astronomy professor, and two graduate students, Jens Schwarz and Luca Giuggioli, are conducting laser induced lightning experiments to help control where lightning strikes.

They said that computer networks, and the companies dependent on them, are usually the first ones to be affected by lightning strikes. Diels says they can save money by using this laser as a means of lightning protection, citing annual fire losses involving about 150 deaths and 139 million dollars in damages. Schwarz said that the project can also help protect Space Shuttle launches and other space missions.

Currently, the experiments are conducted in a shielded room at UNM. Lightning is created by discharging high voltage electrodes which simulate cloud and ground. Lasers are zapped through the electrodes creating a conductive path which the lightning can follow. Instead of the lightning striking in a zigzag motion, the lightning strikes alongside the laser beam path, hitting the ground at a defined spot.

"This is a pretty exciting project," Schwarz said. "It is an extremely powerful experiment," adding that 200,000 volts of electricity are zapped over a distance of 30-40 centimeters. Schwarz said the alternative to lasers is to use rockets with wire to guide lightning, but the problem with that is that the rocket has to come down. By using lasers, he said, it makes the



(l-r) UNM researchers Schwarz, Diels and Giuggioli, and the cylinder used to conduct experiments (below).

process easier and less cumbersome.

Schwarz has been working on the project for four years and it is the subject of his dissertation. His research is primarily on fundamentals of light strings. Giuggioli, who has been working on the project for two and half years, studies lightning discharges and filaments. Schwarz and Giuggioli also study the ionization properties of different gases and other fundamental principles.

Diels said the project has received national as well as international attention and has also been featured in the *London Sunday Times*. The experiments have been successful in the laboratory and he has applied for funds to conduct the experiments in the field. "The idea is to be safe from the hazards of lightning," Diels said. "And that is our intention to create a device that will help protect the public from lightning."



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