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Thunderstorm Research Shocks Conventional Theories; Florida Tech Physicist Throws Open Debate On Lightning's Cause

ScienceDaily (Nov. 6, 2003) — Melbourne, Fla. — If Joseph Dwyer, Florida Tech associate professor of physics, is right, then a lot of what we thought we knew about thunderstorms and lightning is probably wrong.

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In the latest issue of Geophysical Research Letters, the National Science Foundation CAREER Award winner caps two years of lightning research with a startling conclusion: The conditions inside thunderstorms that were long thought necessary to produce lightning actually do not exist in nature.

"For generations, we've believed that in order to produce a lightning discharge, the electric fields inside storms must be very big, similar to the fields that cause you to be shocked when you touch a metal doorknob," said Dwyer.

The problem is scientists have searched inside thunderstorms for many years, looking for these large electric fields, only to come up empty handed. Some researchers have suggested that maybe we haven't been looking hard enough; maybe the big electric fields are really there, but they were somehow just missed. Now, Dwyer's new theory shows that these searches were actually in vain; super-sized fields simply don't exist, period.

"What we've discovered is a new limit in nature. Just as a bucket can only hold so much water, the atmosphere can only hold a certain sized electric field. Beyond that, the electric field is stunted by the rapid creation of gamma-rays and a form of anti-matter called positrons," he said.

While Dwyer's research shows that lightning is not produced by large, unseen electric fields inside storms, the triggering mechanism remains a mystery.

"Although everyone is familiar with lightning, we still don't know much about how it really works," said Dwyer.

Adapted from materials provided by Florida Institute Of Technology.

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