

Toward better solar cells: Chemists gain control of light-harvesting paths

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University of Florida chemists have pioneered a method to tease out promising molecular structures for capturing energy, a step that could speed the development of more efficient, cheaper solar cells.

"This gives us a new way of studying light-matter interactions," said Valeria Kleiman, a UF associate professor of chemistry. "It enables us to study not just how the molecule reacts, but actually to change how it reacts, so we can test different [energy](#) transfer pathways and find the most efficient one."

Kleiman is the principal investigator in the research featured in a paper set to appear Friday in the journal *Science*.

Her work focuses on molecules known as dendrimers whose many branching units make them good energy absorbers. The amount of energy the [synthetic molecules](#) can amass and transfer depends on which path the energy takes as it moves through the molecule. Kleiman and three co-authors are the first to gain control of this process in real time. The team demonstrated that it could use phased tailored [laser](#) pulses -- light whose constituent colors travel at different speeds -- to prompt the energy to travel down different paths.

"What we see is that we control where the energy goes by encoding different information in the excitation pulses," Kleiman said.

Researchers who now test every new [molecular structure](#) for its energy

storage and transfer efficiency may be able to use what Kleiman called a new spectroscopic tool to quickly identify the most promising structures for photovoltaic devices.

"Imagine you want to go from here to Miami, and the road is blocked somewhere," she said. "With this process, we're able to say, 'Don't take that road, follow another one instead.'"

Source: University of Florida ([news](#) : [web](#))

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