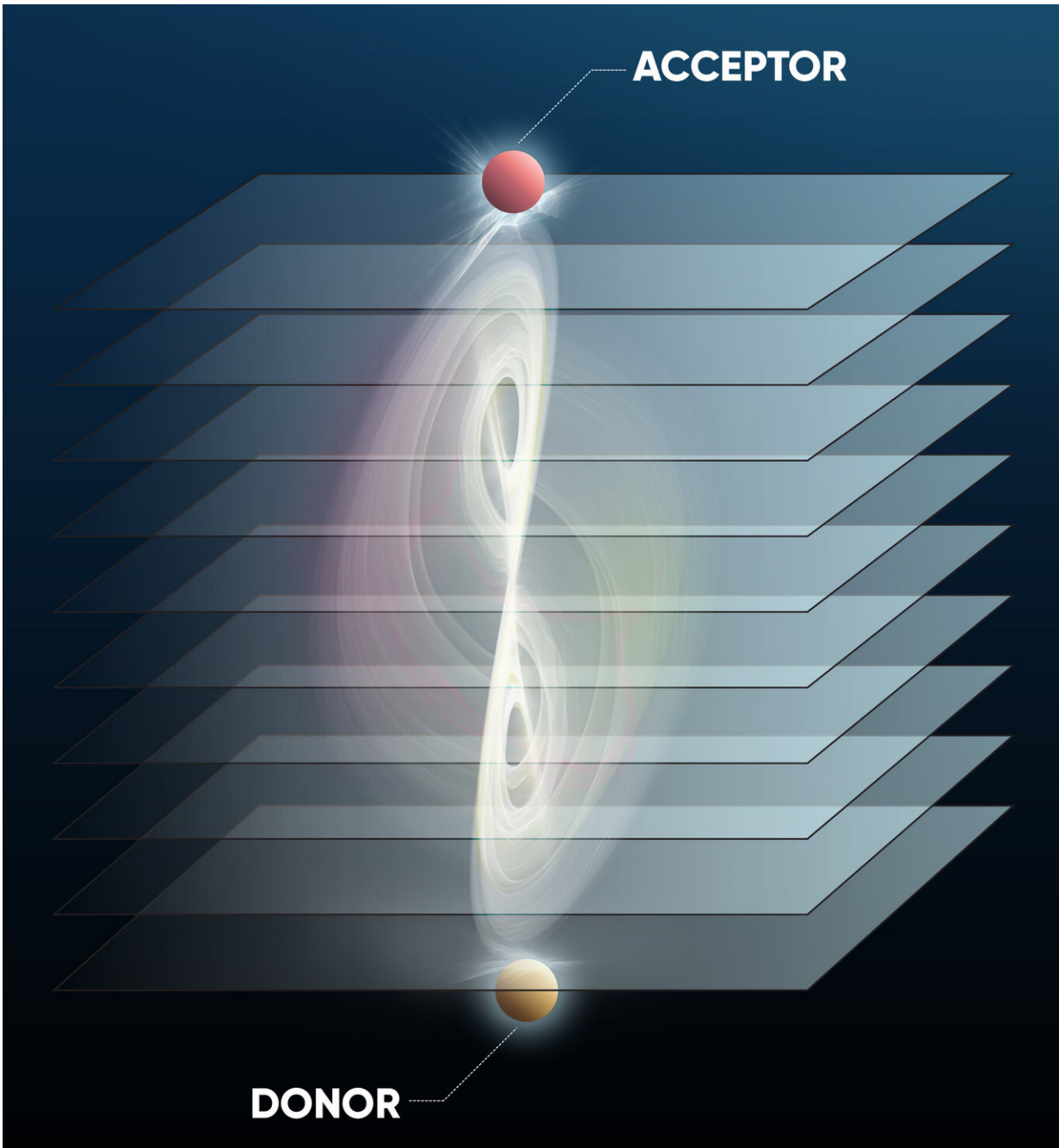


Team study breaks Forster resonant energy transfer (FRET) distance limit

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Schematic of the long-range energy transfer between donor and acceptor molecules enhanced by the metamaterial. Credit: Visakh Menon

Using engineered nanocomposite structures called metamaterials, a City

College of New York-led research team reports the ability to measure a significant increase in the energy transfer between molecules. Reported in the journal *ACS Photonics*, this breakthrough breaks the Förster resonance energy transfer (FRET) distance limit of ~10-20 nanometers, and leads to the possibility of measuring larger molecular assemblies.

And since FRET is a staple technique in many biological and biophysical fields, this new development could benefit pharmaceuticals, for instance.

"Energy [transfer](#) between molecules plays a central role in phenomena such as photosynthesis and is also used as a spectroscopic ruler for identifying structural changes of molecules," said Vinod Menon, professor of physics in City College's Division of Science. "However, the process of [energy](#) transfer is usually limited in the [distance](#) over which it occurs, typically reaching 10 to 20 nm."

But in the study reported by Menon's research group in *ACS Photonics*, the authors demonstrate significant increase in the [energy transfer](#) distance (> 15x) - reaching ~ 160 nm. This is accomplished by using a metamaterial that undergoes a topological transition.

The present work sets the stage for the use of spectroscopic rulers for studying a wide array of larger molecular systems which has not been previously possible using standard FRET technique.

Provided by City College of New York

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