# Article information:

Long-lived spin-polarized intermolecular exciplex states in thermally activated delayed fluorescence-based organic light-emitting diodes | Science Advances
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# Article summary:

1. Researchers have used a spin-resonance spectral hole-burning technique to probe electroluminescence in OLEDs based on thermally activated delayed fluorescence (TADF).

2. The study found that the triplet exciplex states in OLEDs are highly spin-polarized and can be coherently manipulated on a spin-spin relaxation time scale T2\* of 30 ns.

3. Slow spin relaxation, rather than reverse intersystem crossing (RISC), is an efficiency-limiting step for intermolecular donor:acceptor systems in TADF OLEDs.

# Article rating:

Appears moderately imbalanced: The article provides some useful information, but is missing several important points or pieces of evidence that would be required to present the discussed topics in a balanced and reliable way. You are encouraged to seek a more balanced perspective on the presented issues by exploring the provided research topics and looking at different information sources.

# Article analysis:

The article discusses the role of spin-spin interactions in organic light-emitting diodes (OLEDs) based on thermally activated delayed fluorescence (TADF). The authors use the method of electroluminescence detected magnetic resonance (ELDMR) to probe the triplet exciplex states in OLEDs and find that these states are highly spin-polarized. They also observe coherent population oscillations (CPOs), which imply highly spin-polarized exciplex triplet states. The authors conclude that slow spin relaxation rather than RISC is an efficiency-limiting step for intermolecular donor:acceptor systems.

The article provides a detailed analysis of the spin-spin interactions in OLEDs, but it may have some biases and limitations. For example, the study only focuses on one specific donor:acceptor system, m-MTDATA:BPhen, and it is unclear whether the results can be generalized to other TADF emitters. Additionally, the authors do not discuss potential risks associated with using TADF emitters in OLEDs, such as toxicity or environmental impact.

Furthermore, the article does not provide a balanced discussion of the advantages and disadvantages of TADF-based OLEDs compared to other types of OLEDs. While TADF emitters have been shown to achieve high device efficiencies without heavy elements, they may also have limitations such as lower stability or shorter lifetime compared to phosphorescent emitters.

Overall, while the article provides valuable insights into the role of spin-spin interactions in TADF-based OLEDs, it would benefit from a more comprehensive discussion of potential biases and limitations as well as a balanced comparison with other types of OLEDs.

# Topics for further research:

* Toxicity and environmental impact of TADF emitters in OLEDs
* Comparison of TADF-based OLEDs with phosphorescent OLEDs
* Stability and lifetime of TADF-based OLEDs
* Generalization of results to other TADF emitters
* Limitations of the study on m-MTDATA:BPhen donor:acceptor system
* Advantages and disadvantages of TADF-based OLEDs

# Report location:

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