# Article information:

Design and Comparison of Single-Layer Dual-Stator 6/4 FSPM Machine with Toroidal Winding | IEEE Conference Publication | IEEE Xplore
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# Article summary:

1. Single-layer winding structure with toroidal winding can increase the winding factor of dual-stator 6/4 flux-switching permanent magnet (FSPM) machine compared to conventional double-layer winding, resulting in a smaller size or lower electric loading for the same power output.

2. The single-layer toroidal winding topology has better field weakening capability than the double-layer winding topology, making it a more attractive option for high-speed applications.

3. Preliminary experimental tests of single-layer and double-layer winding dual-stator 6/4 FSPM prototype machines show promising results, indicating the potential for practical implementation of this design.

# 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 titled "Design and Comparison of Single-Layer Dual-Stator 6/4 FSPM Machine with Toroidal Winding" presents a study on the design and performance of single-layer winding, dual-stator 6/4 flux-switching permanent magnet (FSPM) machine equipped with toroidal winding. The paper investigates the advantages of using a single-layer topology over the conventional double-layer topology in terms of winding factor, size, electric loading, and field weakening capability.

The article provides a detailed explanation of the operating principle and second harmonic cancellation of the dual-stator 6/4 FSPM machine. It also discusses the challenges associated with conventional three-phase FSPM machines with rotor-pole number less than 10 due to unbalanced magnetic force or asymmetric back electromotive force (EMF). The authors propose a solution to improve the winding factor by using single-layer overlapping winding (SLOW) or toroidal winding.

However, the article has some limitations that need to be addressed. Firstly, it does not provide enough evidence to support its claims about the advantages of using toroidal winding in single-layer topology. While it mentions that toroidal winding reduces manufacturing complexity and risk of turn-to-turn short, it does not provide any data or analysis to support these claims.

Secondly, the article does not explore counterarguments or potential risks associated with using toroidal winding in FSPM machines. For example, it is unclear whether toroidal winding affects other performance parameters such as torque ripple or cogging torque.

Thirdly, the article seems to have a promotional tone towards single-layer toroidal winding without presenting both sides equally. While it acknowledges that SLOW can improve the winding factor, it only focuses on comparing double-layer topology with single-layer toroidal winding.

In conclusion, while this article provides valuable insights into the design and performance of single-layer dual-stator 6/4 FSPM machine with toroidal winding, it has some limitations that need to be addressed. The authors should provide more evidence to support their claims and explore potential risks associated with using toroidal winding in FSPM machines. They should also present both sides equally instead of having a promotional tone towards single-layer toroidal winding.

# Topics for further research:

* Potential risks of using toroidal winding in FSPM machines
* Impact of toroidal winding on torque ripple and cogging torque
* Comparison of single-layer toroidal winding with other winding topologies
* Manufacturing complexity of toroidal winding in FSPM machines
* Turn-to-turn short risk in FSPM machines with toroidal winding
* Advantages and disadvantages of single-layer winding in FSPM machines

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