

# ZF develops magnet-free distinctively compact electric motor

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**With no magnets or rare earth materials, the motor increases the security of supply and offers superior sustainability and efficiency**

German supplier ZF said it has developed an electric motor that does not require magnets. ZF's In-Rotor Inductive-Excited Synchronous Motor (I<sup>2</sup>SM) transmits the energy for the magnetic field via an inductive exciter inside the rotor shaft. This makes the motor uniquely compact with maximum power and torque density, according to the company's September 1 press release.



*Source: ZF*

The supplier said this advanced variant of a separately excited synchronous motor (SESM) is an alternative to permanent-magnet synchronous machines (PSM). The latter are currently the motors most frequently used in electric vehicles, but they are based on magnets that require rare earth materials for their production. With the I<sup>2</sup>SM, ZF is setting a new standard for making e-motors both extremely sustainable in production and highly powerful and efficient in operation.

**Significance:** Besides the benefits of eliminating rare earth materials in a compact and powerful package, the I<sup>2</sup>SM eliminates the drag losses created in traditional PSM e-motors. This enables better efficiency at certain operating points such as long highway trips at high speed.

Speaking on the new development, Holger Klein, CEO of ZF, said, “With this magnet-free e-motor without rare earth materials, we have another innovation with which we are consistently improving our electric drive portfolio to create even more sustainable, efficient and resource-saving mobility. This is our guiding principle for all new products. And we currently see no competitor that masters this technology as well as ZF.” Compared to common SESM systems, the inductive exciter can reduce losses for the energy transmission into the rotor by 15%. In addition, the CO<sub>2</sub> footprint in production, which arises with PSM e-motors due to magnets including rare earth materials, can be reduced by up to 50%.

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