

## **Abstract**

Many non-conventional electrical machines, including fractional slot permanent magnet machines, step motors, switched reluctance machines, flux switching machines, variable flux machines, fault tolerant machines, and various vernier machines, as well as doubly-fed induction machines and doubly-fed reluctance machines etc., exhibit significant field modulation effect and magnetic gearing effect. They can be classified as field modulated and magnetically geared machines. This keynote speech is a complimentary presentation to the keynote speech of SMART2022. The principles and features of field modulation and magnetic gearing effects in torque production will be highlighted. The emphasis will be on the overview of their historical developments, current applications, and future research trends, together with a comparison of other more classical analytical methods.