US 20240235286A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2024/0235286 A1

XU et al. (43) Pub. Date: Jul. 11, 2024

(54) **SINGLE WINDING HYBRID EXCITATION MAGNETIC FIELD MODULATION MOTOR AND SYNERGY EXCITATION DESIGN METHOD THEREOF**

(71) Applicant: **JIANGSU UNIVERSITY**, Zhenjiang (CN)

(72) Inventors: **Liang XU**, Zhenjiang (CN); **Lele CHANG**, Zhenjiang (CN); **Tingting JIANG**, Zhenjiang (CN); **Wenxiang ZHAO**, Zhenjiang (CN)

(73) Assignee: **JIANGSU UNIVERSITY**, Zhenjiang (CN)

(21) Appl. No.: **18/008,452**

(22) PCT Filed: **May 12, 2022**

(86) PCT No.: **PCT/CN2022/092335**

§ 371 (c)(1),
(2) Date: **Dec. 6, 2022**

(30) **Foreign Application Priority Data**

Mar. 16, 2022 (CN) 202210257690.3

Publication Classification

(51) **Int. Cl.**

H02K 1/17	(2006.01)
H02K 1/16	(2006.01)
H02K 3/28	(2006.01)
H02K 15/02	(2006.01)

(52) **U.S. Cl.**

CPC ***H02K 1/17*** (2013.01); ***H02K 1/165*** (2013.01); ***H02K 3/28*** (2013.01); ***H02K 15/02*** (2013.01); *H02K 2213/03* (2013.01)

(57) **ABSTRACT**

A single winding hybrid excitation magnetic field modulation motor includes a stator, a rotor, a winding and a permanent magnet. The stator includes a stator iron core, a permanent magnet and a winding. The stator iron core includes stator teeth and stator yoke. Each stator tooth is split into an equal number of split teeth facing the air gap side. All permanent magnets are embedded in the grooves between the split teeth on the same stator tooth, the polarity of all permanent magnets located on the same stator tooth is the same, and the polarity of the permanent magnets on the adjacent stator teeth is opposite. A single non-overlapping concentrated winding is wound on all stator teeth, and DC current and AC current are simultaneously passed into each set of windings, in which field winding and permanent magnet are excited together to form hybrid excitation.