

Automorphisms and Large Cardinals

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We unveil an intimate relationship between the existence of certain automorphisms of models of completions T of Zermelo-Fraenkel set theory, and the existence of large cardinals from the point of view of T . For example, we prove the following theorem, which can be used to provide a generalization of an unpublished result of Solovay calibrating the consistency strength of the system NFUA obtained by adding the axioms of infinity, choice, and “every cantorlian set is strongly cantorlian” to the Quine-Jensen system NFU of set theory with a universal set.

Theorem. The following are equivalent for a completion T of ZFC:

- A. There is a model M of T with a nontrivial automorphism whose fixed point set is a proper epsilon initial segment of M .
- B. For every natural number n , T proves that there is a Σ_n reflecting n -Mahlo cardinal.