

## Research Highlight: Polarized symmetries of algebraic manifolds

### Work of Professor ZHANG De-Qi

A symmetry  $f: X \rightarrow X$  of a projective variety  $X$  is polarized if the  $f$ -pullback of a positive line bundle class is a larger multiple of the same class. In his 1960 paper, Serre solved Weil's conjecture about  $f$ -eigenvalues on cohomologies.

In the joint paper [1] of Professor Zhang and his collaborator Dr Meng, the structure theorem of the pair  $(X, f)$  is given. Precisely, assuming the variety  $X$  is smooth or mildly singular, an  $f$ -equivariant minimal model program ( $f$ -EMMP) has been proved to exist, extending Mori's MMP theory to an equivariant version.

Possible applications of [1] are in number theory: Dynamical Manin-Mumford conjecture asserting that every subvariety containing a dense set of periodic points (plus some extra assumption) is itself periodic, as well as the Kawaguchi-Silverman conjecture on the equality of arithmetic degrees of rational points and dynamical degree of a symmetry, as cited in [arXiv:1902.06071](https://arxiv.org/abs/1902.06071) and [arXiv:1902.06072](https://arxiv.org/abs/1902.06072)

#### Reference:

[1] Sheng Meng and De-Qi Zhang, Building blocks of polarized endomorphisms of normal projective varieties, *Advances in Mathematics*, 325 (2018): 243-273.