

## Abstract

Perelman's remarkable stability theorem states that if  $X$  is a compact  $n$ -dimensional Alexandrov space with curvature  $\geq k$ , then for any  $\varepsilon > 0$ , there exists  $\delta = \delta(X, \varepsilon) > 0$  such that for any  $n$ -dimensional Alexandrov space  $Y$  with curvature  $\geq k$ , if  $Y$  is Gromov-Hausdorff close to  $X$  by a  $\delta$ -approximation  $f: X \rightarrow Y$ , then there is a homeomorphism  $g: X \rightarrow Y$  which is  $\varepsilon$ -close to  $f$ .

We will present a canonical proof of this theorem, for which the homeomorphism  $f$  is constructed purely in line with the metrics of  $X$  and  $Y$ . This canonical proof may help to solve the bi-Lipschitz Stability Conjecture.