

# Detailed Diagnostic of the Mystery of the Famous Diagonal Ridge Pattern in the Milky Way

Our solar neighborhood has many asymmetries, such as arch shape, snail shape and ridge shape. Up to now, our astronomers are still not sure about the origins and evolution of the famous ridge structure due to the lack of clear and solid evidence in multiple parameter space.

Recently, a research team, led by LAMOST Fellow Dr. WANG Haifeng collaborating with Chinese and Spanish astronomers, performed a detailed Chemo-Dynamical analysis of the diagonal ridge feature of our Milky Way and presented a timing tagging for it with the help of LAMOST data.

Researchers recovered the ridge pattern and found that this feature is presented by stars of a wide age span, from very young to very old. Meanwhile, some ridge features are also revealed in the chemical space.

“We found that there might be two kinds of ridge patterns with different dynamical origins and evolutions, based on the statistical analysis”, said Dr. WANG, the first author of the paper.

The viewpoint of the two kinds of origins is also supported, via recent emails, by Prof. Joss Bland-Hawthorn, an astronomer from the University of Sydney of Australia.

“Some previous works pointed out clearly that the spiral arms in our home galaxy can generate ridges accompanied with the points that different ridges could have originated from different scenarios, but if they want to unify the global picture, the well-known Sagittarius satellite perturbation is favored”, said Dr. Martín López-Corredoira, co-author of this paper.

“In this work, we actually detect signals similar to what had been shown in some previous works, and we give more information about time tagging and chemical tagging”, said Dr. WANG.

“All these studies might support that both the

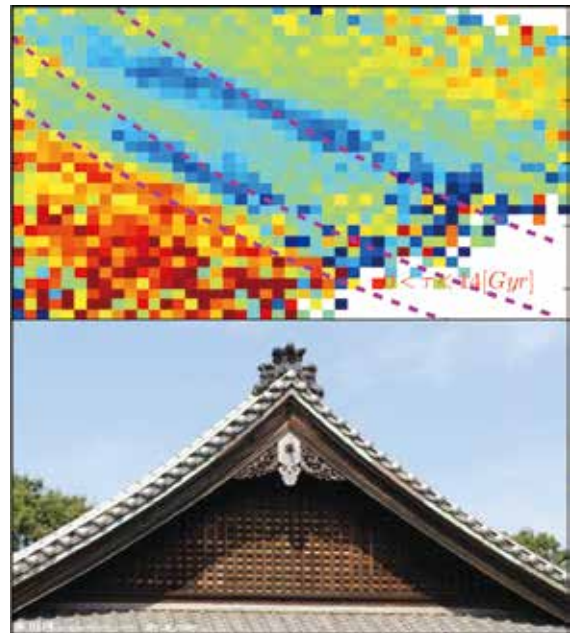


Figure 1: Ridge maps are shown explaining the structure of the Galactic diagonal ridge, with the top one giving the ridge structure in the eyes of astronomers, and the bottom one the ridge shape in our lives as an analogue. (Credit: WANG Haifeng)

spiral arms as an internal mechanism and the Sgr perturbations as an external mechanism are important contributors for this structure so that we will work more for this intriguing topic”, said Dr. Martín López-Corredoira.

Referee of this paper pointed out that “These results provide additional constraints on the theoretical models, and encourage further theoretical studies to distinguish these scenarios based on the new observational constraints”.

The paper recently was published by *The Astrophysical Journal* on Oct 13, 2020.

This paper can be accessed at the link <https://iopscience.iop.org/article/10.3847/1538-4357/abb3c8>

(NAOC)