4TH SHAW-IAU WORKSHOP ON ASTRONOMY FOR EDUCATION

A typical case on teaching Hertzsprung–Russell diagram by exploring the nature of astronomy diagrams

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The needs

- The special characteristics and significance of astronomy call for higher quality of the undergraduate teaching on fundamental astronomy.

The origin

- The H-R diagram is used to revealing the process of the stellar evolution. For our undergraduates, such judgement seems to be taken for granted. The fact is that no one is able to explain it exactly.

The focus

- The H-R diagram was created and improved by induction, while the related explain on stellar evolution by deduction. Therefore, the relationship between such inductive diagram and the deductive explain may calls methodology confusion.

Exploring the diagram among the modern astronomy history

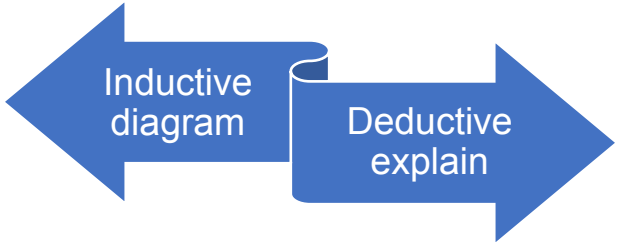
- First of all, it is important to explore the basic needs for creating the H-R diagram as a part of modern astronomy history, which can be contributed to the needs for classifying various types of stars that have been observed and analyzed with various scientific methods used for the classification. Related contributions by Astronomer Rockier, Ms. Cannon and Ms. Murray should be rediscovered.

Analyzing the theory of stellar internal structure developed in the same era

- Secondly, it is necessary to analyze the theory of the stellar internal structure developed in the same era with the H–R diagram. For example, *Internal Constitution of the Stars* by Arthur Stanley Eddington and Vogt-Russell theorem are representative with explaining the distribution and evolution of stars as well as the synthesis and evolution of elements on the H–R diagram.

Visualizing the generation of the diagram

- At last, with the improvement of observational methods and computing performance, astronomers are able to show the generation of H–R diagrams by rotating the three-dimensional distribution of various types of stars in one globular cluster, which will help students to understand H-R diagrams more visually and professionally.



The teaching objective improved

- With a deeper understanding of the scientific methods and scientific theories for the H–R diagram, it is expected to further reach to its nature.

Challenges for the teachers

- The teaching improvement on the H–R diagram brings several challenges to teachers who should try to integrate related history and methodology of the H–R diagram with help from experts and carry out group discussions to achieve the core objective for teaching.