MUNI

POSUDEK OPONENTA HABILITAČNÍ PRÁCE

Masarykova univerzita	
Uchazeč	Ernst Paunzen, Dr.rer.nat
Habilitační práce	The Δa photometric system
Oponent	Prof.RNDr. Petr Harmanec, DrSc
Pracoviště oponenta, instituce	Astronomical Institute of Charles University, Faculty of Mathematics and Physics

The habilitation Thesis of dr. Paunzen represents a very comprehensive piece of work. It starts with and a summary of the history of the development of one special photometric system, originally dedicated to studies of chemically peculiar stars. Then it provides an overview of numerous studies based on this observational technique. Historically, the Δa photometric system was designed to monitor the continuum depression near 5200 A, which is a characteristic property of some types of chemically peculiar (CP) stars. Studying the properties of this photometric index and its dependence on spectral type for normal stars, dr. Paunzen demonstates that this type of photometric studies can be extended to investigation of many different types of objects and serve as a detection tool of various peculiarities for faint objects, including some outside our Galaxy. He also discusses at length various calibrations of the index with respect to the effective temperature, reddening etc. and also realization of the system with the help of modelling based on transmission curves and synthetic stellar spectra.

The study can serve as a very good and inspiring introduction not only for those interested in studies of CP stars but also for university students of astronomy seeking inspiration for a topic of their future own studies. Paunzen's text embraces a large range of astronomical objects and provides basic information about their nature and properties.

I have no serious critical remarks to this extended collection of results and investigations in this area. I also appreciate a surprisingly small number of misprints and inaccuracies considering the length of the text.

Just to mention some examples:

Page 19 Captions of Figure 4 should contain explanation of different colour symbols shown in the plot.

Be/shell stars are first discussed in sect. 5.2 but their definition appers only later in sect. 7.3 and the information provided is rather brief and incomplete, especially in comparison to some other phenomenological types of stars discussed in the following subsections. . A better reference for an overview of the topic than Porter and Rivinius would perhaps be a review by Rivinius et al. (2013) A&A Rev. 21,69.

In summary, I consider the presented Thesis as fully acceptable for the defense.

Dotazy oponenta k obhajobě habilitační práce (počet dotazů dle zvážení oponenta)

The candidate could discuss one aspect of data reduction, which I have not found in the text. It is usual that a standard photometric system is developed from an instrumental system of one telescope and defined by a set of standard stars and suitable transformation formulae, with which the instrumental system of another telescope can be transformed to the standard one every observing season. The colour properties of each telescope and photometer are slowly changing with time and this is, why such transformations are needed for an accurate work. I understand that with relatively narrow g filters and creation of a normalized index, these effects could be smaller than in other cases, but also the Stromgren system is always transformed to the stardard one. Besides, the range of variability of the Δa index is small, so similar effects must play some role. Could the candidate address this question during the defense?

Závěr

The Thesis of Dr. Ernst Paunzen ``The Δa photometric system" fulfills the standard requirements for such studies in the field of Theoretical Physics and Astrophysics.

Praha dne 11.3.2021