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To Whom It May Concern

I, Łukasz Stawarz, Head of the Department of High Energy Astrophysics of the Astronomical Observatory of the Jagiellonian University, write this letter of recommendation to support Rameshan Thimmappa's application for doctoral degree. As the advisor for his doctoral studies, I have had the opportunity of working with Rameshan on several research projects, during the last five years.

Rameshan Thimmappa, M.Sci., began his Ph.D. fellowship in our lab in October 2015, under the supervision of Prof. Michał Ostrowski. The first topic of his research was the multi-wavelength study of the Centaurus A radio galaxy. At that time, Rameshan became familiar with the basics of the astronomical data analysis, in particular with the Chandra X-ray Telescope data analysis using the CIAO software package. From October 2016 until now, Rameshan works primarily under my supervision. Due to his general enthusiasm regarding the X-ray data analysis, the research topic I have proposed was a comprehensive re-analysis of all the available Chandra data for the Pictor A radio galaxy. This work, carried out during the remaining years of Rameshan's Ph.D. at Jagiellonian, culminated in his first, first-author publication, "*Chandra Imaging of the Western Hotspot in the Radio Galaxy Pictor A: Image Deconvolution and Variability Analysis*", which was published in the leading international journal for astrophysics last year (Thimmappa et al., 2020, The Astrophysical Journal, 903, 109). Rameshan is currently completing his research on the topic, with a few other papers in preparation, either already submitted, or to be submitted for publication within the next months. With such, I am certain that Rameshan can indeed be awarded a doctoral degree.

Rameshan Thimmappa has shown adaptability in adjusting to a new country and continued to improve his skills in the Chandra data analysis, and his programming skills in general. He is a very nice person to work with, a very down-to-earth person as well, although he still requires some help and guidance from senior colleagues and advisors. His main limitation lies in his somewhat limited astrophysical background, and his main advantage as a young scientist, is the already aforementioned enthusiasm regarding the astronomical instrumentarium and data analysis. Should he choose to pursue further his scientific career as an astrophysicist, I am confident that he will find the ways to improve using every opportunity. As stated in the Summary of this Dissertation, together with Rameshan we both sincerely hope that his effort directed into mastering the astronomical X-ray data analysis techniques, and in this way understanding better the X-ray emission of a particular active galaxy Pictor A, did provide a notable contribution to the modern high-energy astrophysics already at this point.

Sincerely

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