

Activity Report of the NAOJ Visiting Scholar Program

Host Project/Division: TMT Project
 Name of Host Scientist: Wako Aoki
 Name of Visiting Scholar: Mudumba Parthasarathy
 Title: Visiting Professor

Period: 20/09/01–20/10/31

I . Report from the visiting scholar

[1] Achievement during the period of stay (in comparison with the initial plan) *Please fill out the attachment if you have made presentations at academic conferences or if your research has been published in academic journals

(Collaborative Research)

We have more than 10 meetings during the visit to discuss about the properties of post-AGB stars with low metallicity, including the new data obtained with Gaia. We also obtained a high-resolution spectrum for a candidate metal-poor post-AGB star with Subaru/HDS. We made a draft of a paper following our work during my visit. We also have discussions on other topics on post-AGB stars and binary evolution. A paper, in which I am a co-author with NAOJ affiliation, was recently published in MNRAS. This paper is on IR properties of planetary nebulae with [WC] -type post-AGB central stars.

Followings are progress for each individual topics given in the proposal.

1) Late F and early G dwarfs: Data reduction of the high resolution spectra of the stars mentioned in the above topic is in progress.
 2) Post-AGB stars: We had discussion on the above topic and as my visit was only for two months we have made some progress.
 3) Post-AGB F supergiant CRL 2688: We had a discussion on the above topic and we made progress in the analysis of the spectrum in collaboration with Dr. Thomas Masseron (IAC). It will take some more time to complete the analysis.
 4) G & K giants and subgiants companions of totally eclipsing: We made progress on this topic. I requested some time back Dr. Bharat Kumar Yerra (NAOC) to cross-correlate the latest online catalogue of Algol-type close-binary stars with the LAMOST spectra archive. We found several Algol-type close-binary stars with LAMOST spectra. We found few metal-poor Algols and several Algols with H-alpha emission. Prof. Wako Aoki-san obtained the spectrum of one metal-poor Algol with $[Fe/H] = -2.0$ with Subaru HDS. Analysis of the data is in progress in collaboration with Prof. Wako Aoki-san and Dr. Bharat Kumar Y (NAOC). So far no one has found metal-poor Algols. This study of metal-poor Algols will shed new light on the population - II low mass mass-transfer close binaries and their evolution. Some progress was also made on the study of LAMOST spectra of Algols with H-alpha emission.

We discussed the progress of the analysis of Subaru HDS spectrum of totally eclipsing Algol-type close binary SX Dra. We are deriving the chemical composition of this system in collaboration with Dr. Thomas Masseron (IAC). It may take few more months to prepare the draft of the paper on the chemical composition of the components of this totally eclipsing Algol system SX Dra.

We also made progress in identifying high velocity hot OB supergiants using the LSE, LSS, and LS catalogues and Gaia-DR2 data. From the Gaia-DR2 data we found few LSE, LSS, and LS OB supergiants with high radial velocities and reliable Gaia-DR 2 parallaxes. Some of these may be hot (OB) post-AGB stars. We plan to search the LAMOST spectra archive for the spectra of these stars for further study.

(Education)

I gave a talk in the HDS seminar on October 16 with the title "The puzzling high velocity G5 supergiant star HD 179821 : new insight from Gaia DR 2 data". I had rich discussions with the Sokendai graduate student Tadafumi Matsuno-san.

(Others)

[2] Any comments on this program

I would like to thank for giving me an opportunity to visit NAOJ. Although the visit is not long, the support was very effective to promote our collaboration.

II . Report from the host scientist

[3] Any comments on this program

【Attachment】Activity Report for NAOJ Visiting Scholar Program

Name	Affiliation	Research Title	ID
Mudumba Parthasarathy	Indian Institute of Astrophysics (IIA)	Parthasarathy, Mudumba	

Date:

1 Refereed Papers in European-languages

No need to fill out	Authors' names (No need to fill out if DOI has been assigned)	Year of publication	Title	Journal	Volume (※1)	Page or ID (No need to fill out if DOI has been assigned)	DOI (if assigned)	Year of survey	Notes
	Muthumariappan, C., Parthasarathy, M.	2020	Infrared properties of Planetary Nebulae with [WR] and wels central stars	MNRAS	212	in press	10.1093/mnras/staa217		

2 Refereed Papers in Japanese.

Alphabet of first author	Authors' names (No need to fill out if DOI has been assigned)	Year of publication	Title	Journal	Volume (※1)	Page or ID (No need to fill out if DOI has been assigned)	DOI (if assigned)	Year of survey	Notes

3 Presentations at international/domestic conferences, and/or meetings.

No need to fill out	Speakers' names	Year	Title	Name	Location + period	Invited lecture (※2)	Year of survey	Notes

4 Master/Doctor thesis

No need to fill out	Authors' name	Year	Title	University	Language	Type of degree	DOI (if assigned)	Year of survey	Notes

5 Others

(※1) You may leave this column blank if there is no volume number. If you need to describe the issue number, write it in pare
(※2) In the case of an invited lecture, put a “*” in the column.