

日本天文学会早川幸男基金渡航報告書

2024年6月10日採択

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| 申請者氏名 | Xu Yi(会員番号 8262) |
| 連絡先住所 | 〒 277-0882 千葉県柏市柏の葉 5-1-5 東京大学 宇宙線研究所 |
| 所属機関 | 東京大学 |
| 職あるいは学年 | D3 |
| 任期 (再任昇格条件) | |
| 渡航目的 | 研究集会での口頭発表/セミナートーク |
| 講演・観測・研究題目 | Stellar and AGN Feedback Probed with Outflows in JWST Galaxies at $z = 3 - 9$: Implications of More Frequent and Spherical Galactic Fountains |
| 渡航先 (期間) | イタリア/スイス/スウェーデン (2024年6月16日～6月29日) |

During this trip, I attended a conference named “Cosmic Dawn at High Latitudes” (<https://indico.fysik.su.se/event/8499/>) held in Stockholm, Sweden. The conference focused on early galaxy evolution and the interplay with intergalactic medium in the epoch of reionization. I also visited four research institutes in Europe and gave three seminar talks. The total length of this trip is 15 days.

The conference highlighted important topics in the early universe and critical questions to be answered by JWST. Among them, I find several important topics that I would be interested to further study in details: exotic chemical abundances and different stellar population models to explain them, dust production in the early universe and how it affects the observed galaxy structures, treatment of feedback in simulations and how we can test them observationally.

In the conference, I gave an oral presentation with the title of “Gas Kinematics with JWST: Disk Rotation and Outflows”. The presentation includes the findings from two studies I was working on about galactic outflows from $z \sim 3$ to $z \sim 9$ and rotating disk identified at $z \sim 10$, both of which are under journal review at that time. I received an important question from the audience regarding distinguishing outflows from inflows and mergers, which is later reflected in the revised manuscript. There was also a simulation work showing the burstiness of feedback process and that during the phase of more moderate feedback dynamical cold disk can form within a short time scale, which supports my recent finding of rotation disk galaxy formed in the first 400 Myr of the Universe. During the conference I also had discussions with other researchers in the extragalactic field such Joakim Rosdahl, Hiddo Algera, Will McClymont. I also met Koki Kaiichi for the first time who will soon be my supervisor for my next postdoc position at DAWN, University of Copenhagen.

Before the conference, I visited Scuola Normale Superiore di Pisa, Arcetri Astrophysical

Observatory, University of Geneva, and European Southern Observatory. In Scuola Normale Superiore di Pisa, my host Stefano Carniani was unfortunately sick on the day. But I have exchanged latest progresses with Giacomo Venturi working on metallicity gradient in high- z galaxies, Eleonora Parlanti working on galaxy kinematics and high- z ANGs, Ivan Kostyuk working on simulating galactic outflows and mergers, Yurina Nakazato working on theoretical modelling of clumpy galaxies. All of them are active young researchers involved in JWST research. In Arcetri Astrophysical Observatory, I gave a presentation and discussed with Federico Lelli who is an expert of galaxy dynamics and kindly shared with me many details on analytical models of rotating disk given mass distribution. In Geneva observatory, I have discussed with Daniel Schaerer and Pascal Oesch who are experienced astronomers and leading researchers in the field of high- z universe. P. Oesch and I discussed various science outcomes from JWST NIRCам WFSS programs such as FRESCO. D. Schaerer and I exchanged the ideas about studying local extremely metal-poor galaxies using infrared emission lines observed with JWST. In all the three institutes listed above, I gave a seminar talk regarding my recent research on the earliest rotating disk identified with JWST. I also stopped by European Southern Observatory and discussed with Carlos De Breuck who is an experienced researcher with ALMA.

In summary, the presentations in the conference and information exchanged with other researchers have vastly increase my knowledge of the research field. It strongly motivates me to explore different topics. The interaction with other researchers is also very helpful for me to build up connections and improve communication skills. I truly appreciate Hayakawa Funding for supporting my trip. I hope many young researchers like me can have such an opportunity to expose themselves to the science community worldwide.

Photos attached are the conference venue (Swedish Royal Academy of Sciences) and a tour to the press room previously used for Nobel Prize.

