

# Plan for research and GPPU activity

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## 1 About GPPU point

10 GSP points and 10 GASP points are required for me. Considering the influence of Coronavirus, I should attend not only GPPU seminars but also several schools. I will make an effort to achieve this requirement **by the end of my second year** so that I have enough time to write my doctoral thesis.

## 2 Plan for research and study abroad

I will continue the research on the axion cosmology. In particular, I focus on the property of the axion dark matter. There remain some unsolved questions on the dynamics. The axion dynamics can be affected by the contribution from the high energy physics (e.g. GUT, string theory) which may change the axion potential. This is my current and also future work. Also I am interested in the connection between the axion dark matter and other phenomena. For example, I would like to investigate the scenario where axions can explain both dark matter and inflation.

Regarding the overseas training, there are three candidates as collaborator: Kwang Sik Jeong (Pusan National University, Korea), Kiwoon Choi (Institute for Basic Science, Korea), Mark Hertzberg (Tufts University, the U.S.). They are working on the axion cosmology and other subjects on particle phenomenology. When I went to Germany last March, I talked with Mark Hertzberg about my previous research. However, it may take much time for the bad situation in the U.S. to be relaxed, so first, I'm going to make contact with **Jeong and Choi**. If the request is allowed, I would like to work on cosmology involving multiple axions with them. In that case, the complicated effects on the axion abundance can be expected, and the new view of the axion dark matter will be obtained. **By the end of the second year**, I plan to have achieved the requirements for the overseas training,