様式 2 (Form 2)

（2015 年 1 月改定）

滞在型研究員報告書
Activity Report for the NAOJ Visiting Fellows Program

所　　属 (Institution)	Bauman Moscow State Technical University
氏　　名 (Name)	Mikhail Barkin
研究課題名 (Research subject)	Modern analytic theory of physical librations of the Moon of three-layer model
滞在期間 (Period of stay)	2015 年　5 月　19 日～　2015 年　5 月　30 日 YYYY　MM　DD　YYYY　MM　DD
受入責任者氏名 (NAOJ host researcher)	花田英夫 (Hideo Hanada)

１．滞在型研究員として国立天文台滞在中に行った活動について簡単にお書きください。
(Summarize your activities during the stay using the NAOJ Visiting Fellows Program.)

1) I Participated in the organization and work of the Section ”Space and Planetary Sciences” at Japan Geoscience Union Meeting, 24th May – 28th May, 2015.
2) I discussed with RISE members at seminars in NAOJ (Tokyo, Mizusawa). The subject was the perspective directions on development of the analytical theory of the three-layer Moon on the basis of two independent directions which were earlier discussed in respect of annexes to the theory of rotation of Earth. In case of the Moon the specified techniques have the specifics connected with resonant nature of rotation of the Moon and need of the high-precision description of the orbital movement of the Moon.
3) I reviewed the contemporary research of rotational motion of the Earth and the Moon on the basis of a common approach based on the Hamiltonian formalism and of a special approach to the problem and the methods of perturbation theory. And I Built an analytical theories of rotational motion of the Earth and the Moon in Andoyer – Poincare variables.

２．今回滞在型研究員として得られた成果について簡単にお書きください。
(Summarize your research products from the stay.)

In our previous works, perturbations of mixed type in the rotation of the Moon weren't studied. Therefore, I planned to study the forced librations of k t sin t, t cos t, due to the second harmonics of the power function of the system of the Earth and the non-spherical Moon. I defined constants and the conditions, and simulated periodic and mixed librations of the Moon caused by the third harmonics of its power function. I compared it with other similar components of modern empirical theory by Rambaux and Williams (2011).
As scheduled, I completed in writing the program for tabulation of the amplitudes of the forced perturbations of mixed type in the theory of the physical librations of the Moon, due to the second and the third harmonics of the power function.

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３．この制度について何か御意見がありましたら、お書きください。 (Please provide any comments about this program.)
Staying in the Astronomical Observatory of Mizusawa gave me a lot of experience. This is a very good place to work and obtain new scientific results. Also in observatory works many very good researchers, which helps in any cases and give many advices. I am very grateful to everyone for their help in the work, especially prof. Hideo Hanada, without him my visit and work in the project would have been impossible.