

(4) Assoc. Prof. Szaniszló Berczi

Department of General Physics, Eotvos Lorand University, Budapest, Hungary



世話教官：理学部・化学地球科学科助教授 三浦保範

Introduction

Thanks to Prof. Yasunori Miura and his Yamaguchi University for the invitation and the possibility to teach and research on Yamaguchi University, Graduate School of Science and Engineering, Venture Business Laboratory.

We were working together with Prof. Miura in the Japanese - Hungarian Science and Technology Cooperation (JHSTC) program in the topics of cosmic materials research. We organized TISS meetings in 1997 and 1998, and I had the nice occasion to visit Yamaguchi, this beautiful town in 1999 on the PIECE Meeting, in the conference on cosmic materials and field trips.

Teaching programs

During my three weeks I taught students in various fields of my topics. I had lectures on the Friday and Monday courses of Materials science and Cosmic Materials. In these courses my lectures were given in the following topics: Lunar stratigraphy, lunar samples from Apollo missions and from Antarctica, geological history of the Moon, and so on.

The VBL lecture

The VBL lecture was held on 25th January 2002. The main topics was the Hunveyor construction, and cosmic material studies. More than 100 students attended, and after this lecture 6 students showed greater interest how experiments can be constructed to the experimental lander Hunveyor. Hunveyor university lander is a complex system of technologies

(energetic, measuring, communications, but mainly instrument construction program by the students themselves). These technologies are also good examples to the modeling environmental science: this multidisciplinary use of this system is a valuable new strategy in teaching sciences.

Construction and cooperation 1. Hunveyor/Japanveyor

It was our previous plan to cooperate in two topics. One is the Hunveyor. This name is coming from Hungarian University Surveyor (the lunar landing probes Surveyors were the examples to build such type of experimental research tool, a complex system of measurements, which interact with the streams on a planetary surface. The Japanese experimental university space probe was named Japanveyor and it will be built in a joint program of Yamaguchi University and ISAS.

I had here the booklet (although written in Hungarian, but with many figures to overview) of the main steps in construction and experiments and system description of Hunveyor. The main phases of Hunveyor construction was

- Construction of the minimal space probe with "skeleton" of the space probe (frame), on board computer, power supply, two experiments (camera, arm), and the terrestrial control computer, all connected in a system,
- Construction of gradually more separated space probe with IR radio communication, with solar panel and with a few new experiments,
- Construction of a well separated space probe and terrestrial control with radio communication, solar panel, independent power supply several experiments and a test-field surrounding the lander) space probe with rover, internet connection for outer users, developed experiments.

Cooperation in cosmic materials studies

The second field of our cooperation is studies of cosmic materials. Earlier we worked in the IGCP 384 and HJSTC in the research of cosmic spherules and impact materials. TISS and PIECE conferences were organized also on various meteoritic, impact and spherule studies. We also worked on Antarctic meteorites: we formulated evolution trends in the thermal history of a chondritic asteroidal sized body in the light of statistical analyses of chondrites.

Research

Important recent work was done in the field of cosmic materials studies, in topic symmetry and structure of natural and artificial materials: the quasicrystals. Prof. Miura proposed this should be our investigation topics. We used a geometrical approach in which we compared the possible known organizational hierarchies and the new one built from golden rhombohedral units for quasicrystals.

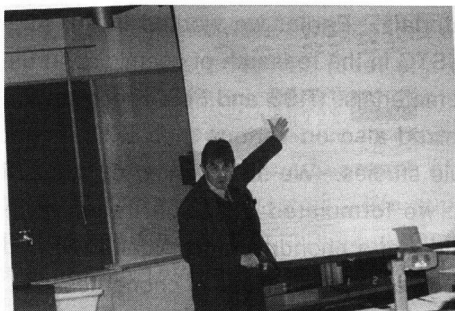
Structural building units with fivefold space point group symmetry are common among quasicrystals. In a higher hierarchy level these units may form rhombic-triacontahedral and stellated rhombic-triacontahedral forms. All these units may form superclusters, which may be higher units and the hierarchy of structures. Some steps in this hierarchical construction was made and that was important to be compared with the hierarchy of other traditionally know well-ordered materials.

Visit at the President of Yamaguchi University

On 23rd of January the President of Yamaguchi University, Prof. Heyisuke Hironaka received us for a short talk. He is a famous mathematician with Fields Medal Prize and we talked how mathematics and art, and moreover complexity of sciences step by step entrance the universities. We agreed that interdisciplinarity and open hearth approaches are important in research works. He also enjoyed some graphic works in the boundary of mathematics and art. Our half-hour discussion was a fruitful talk, for which I here express my grateful thanks to President Professor Hironaka.

History

I had a nice possibility to study the bright historical pages of Yamaguchi City. With Prof. Yasunori Miura we visited several beautiful shrines and temples. Especially the Ouchi family and the Mori family played important role in the history of Yamaguchi Province.



We found an interesting coincidence between golden rhombus (faces of our polyhedra in quasicrystal studies) and the Family crest of Ouches, which is a very good approximation to this golden rhombus. We show finally such a quasicrystalline form decorated with an Ouchi crest, symbolizing also our cooperation in the future.

Stellated rhombic triacontahedron with Ouchi crest faces (graphics by Sandor Kabai, Hungary)

Future collaboration (JHSTC)

During my staying in the Yamaguchi University we formulated the realization of the continuation of the cosmic material studies of Japanese-Hungarian Scientific and Technology Cooperation Project (JHSTC) first signed by us in 1996, which mainly projected on research of impacts, impact materials and cosmic spherules.

The new program contains two fields, as reported earlier:

1. Hunveyor/Japanveyor construction,
2. Cosmic material studies (meteorites, lunar samples, spherules and quasicrystals were involved)

We formulated a Letter of intent of this JHSTC cooperation, which is necessary to the organization in the Hungarian side.

Summary

Again, I would like to express my grateful thanks to Professor Yasunori Miura for the invitation and kind arrangement of my visit in the Yamaguchi University. I feel I understood more about the Japanese history and culture, which was shown kindly by Professor Miura. I especially say thanks to him and his family for my invitation for a dinner into the circle of the kind family and I also thanks for their hospitality. I am looking forward to further cooperation with the Yamaguchi University, cooperation in the JHSTC fields and also in the fields of connected art and science (symmetry) research, too.