Executive Summary

The Racah Institute is the oldest physics department in the country and has constantly maintained its high national and international standing. It should continue to function at the highest level and should strive to remain excellent. Future hiring should be guided by this pursuit of excellence; the overriding consideration being the quality of the candidate, with the field of research playing a secondary role.

The committee commends the recent hirings in the Racah Institute that are based on a broad coverage of existing research activities and early entry into new fields such as biophysics and quantum information. The committee encourages the Racah Institute to continue the trend of increasing the number of experimenters relative to theorists. At the very least half of the Faculty members should be experimenters.

With no applied scientist on the Committee we are unable to judge the academic standard of the research in the Department of Applied Physics. However, an activity of this type linking the University to high-tech industry may be a significant asset.

The overall research in the Racah Institute is very strong. The astrophysics and the high-energy theory groups stand out as excellent, followed by the condensed-matter group. These strengths of the Racah Institute should be maintained and reinforced. Given the breadth of the current and recommended research activity and the size and quality of the student body, we recommend that the Racah Institute should optimally have 50 faculty members, but certainly no less than 40. The ratio of staff to advanced students in Applied Physics is smaller than in the Racah Institute and may need amelioration.

The research excellence and leading status of the Racah Institute are seriously endangered by the severe decline in the technical and administrative support available for faculty members both in research and in teaching. The administrative staff is much too small. The technical staff formerly assigned to individual labs has been abolished. The machine shop personnel has been significantly reduced. There is a single electronic technician who is going to retire soon. There is only one computer support person.
The past high level of instruction in the Department has deteriorated over the last years due to budgetary cuts. The number of teaching assistants has been dramatically reduced, resulting in large classes which prevent essential personal student-lecturer interaction and important feedback. This situation also affects the graduate students who have lost an essential source of income. The financial cuts have also affected the teaching labs. They suffer from lack of new equipment, modern experiments cannot be offered and the students cannot perform independent and original projects.

We have found similar serious problems in the Department of Applied Physics.

The committee urges the University administration to find the resources to immediately remedy this catastrophic situation in teaching and research.

The number of elective courses, particularly in the M.Sc. and Ph.D. curricula, and the flexibility in their choice by the students are restricted. This should be changed. Moreover, a biophysics course at the undergraduate level should be introduced. However, extended training in biophysics should not come at the expense of rigor. The issues relating to teaching have been addressed recently in detail in the report of the Council of higher Education's Physics Teaching Evaluation Committee, which we have read and strongly endorse.

Currently the Racah Institute is spread over five different buildings. This leads to a serious lack of cohesion. Useful communication between people in different groups, which is absolutely essential in stimulating new ideas, is curtailed. The committee encourages the University to provide a building which will house the entire Racah Institute. To encourage fruitful interactions between the disciplines, a building located close to other science buildings would be desirable.

**Recommendations**

- To strengthen the two excellent groups in Astrophysics and high-energy physics, a Center for Astroparticle Physics should be formed, a continuation or even extension of the current Einstein center. The sizes of these groups should be at least maintained, requiring new hiring in view of forthcoming retirements. The addition of a phenomenologist in the high-energy group is strongly recommended. If an excellent candidate is available, hiring another astrophysicist is recommended.
- The newly formed biophysics group, currently only two faculty members, should be expanded to a “critical mass” of 4-5 members. A high priority should be assigned to the development of biophysics courses within the curriculum, at both elementary and advanced levels. Collaborative ties with the life sciences department are strongly encouraged.
- Immediate addition of an electronic support person and at least 1/2 of a computer support person are strongly urged. The administrative and machine shop staff should also be enlarged.
- The number of teaching assistants in the physics courses should be increased so as to allow the marking of weekly assignments and to keep recitation classes to a size of 30-35 students at most.
- The number of elective courses, particularly in the M.Sc. and Ph.D. curricula, should be increased to allow for a larger flexibility in the choice of courses.
- The entire Racah Institute should reside in a single building.