Research Assessment Exercise 2020
Impact Overview Statement

University: City University of Hong Kong
Unit of Assessment (UoA): 7 Physics & Astronomy
Total number of eligible staff of the university in the UoA: 10

(1) Context

The Physics Department was split from the Department of Physics and Materials Science (the AP department) in July 2017, which was established about 25 years ago to provide professional undergraduate education for employment in industries of Hong Kong and the nearby region. Another mission of the AP department was to conduct applied and fundamental research to support the local and regional industries. It was therefore a long tradition of the AP department to have strong links with the local and regional industries and a lot of policies in the AP department were shaped by this mission. Thus, the members of this AU who were staff members of the AP department undertake research activities, which have potential impact on the society, and have high awareness of the importance of research impact.

(2) Approach to impact

The AP department have adopted the following policies to enhance impact:

- Liaise with industrial companies and find internship in summer for students.
- Visit students in the internship scheme
- Appoint industrialist as department advisers
- Faculties were recruited with the consideration of the possible impact on society. Faculties were recruited in the areas of medical physics, photonics, energy materials, spectroscopy.
- Encourage staff to undertake contract research and consultancy work. The policy is built in the performance appraisal and reward scheme

As a result, members of the physics group have been actively making contributions to the society through professional services and applied research activities. The following examples show the impact of the research activities of the physics staff:

1. Assessment of and calibration of radiation equipment for industrial and medical applications: Prof Peter Yu of this unit was a qualified person for assessment of and calibration of radiation equipment for industrial and medical applications. He provided the service to local companies which made use of radioactive substances and irradiation apparatus. This service played an important role in ensuring the safety of using radiation equipment in Hong Kong.
2. Thermoluminescence dating of antiques: Dr P L Leung, a retired staff member of the AP Department has developed the thermoluminescence technique for dating antiques. The dating service provides an important means to verify the actual date of the antique and thus harness the growth of the antique market. In the past ten years, he has verified over [redacted] of antiques for local antique companies, which plays a very important role in the regional antique market.
3. Dr Condon Lau collaborates closely with hospitals in medical physics applications. Dr Condon is a medical physicist who specializes in the use of spectroscopy techniques in characterization of biomaterials and in disease diagnosis. His close relation with local hospitals allows our students to have training in hospitals through final year project (2 projects each).
4. Prof Paul Chu has developed plasma techniques for surface engineering of materials with applications in oil, electronic and biomedical industries. He has founded one company, Plasma Technology Ltd., to market his technology and one of his company was awarded twice Hong Kong Awards for Industry: Technological Achievement Certificate of Merit twice.
5. A new faculty member, Dr Liu Qi, who has joined about a year ago is an expert in the use of synchrotron to characterize materials. His research in battery materials is funded by large

grants from Shenzhen Government in China (3 million RMB) and the Shenzhen-Hong Kong Innovation Circle Fund (3 million RMB). Before he joined CityU, he collaborated with HuaWei on improving battery performance.

6. We received 20 million in Innovation Technology Fund and contract research for applied research studies
7. We are holding 13 patents and filed 24 patents.

(3) Strategy and plans

Since the Department of Physics was established only recently and there is no significant modification of the department's mission, we still maintain this emphasis on the impact of our research work. The following strategies are adopted to further strengthen our work along this direction:

Encourage impact through recognizing collaboration with industry or industrial research funding in staff appraisal: Academic staff's annual pay review is directly linked to the performance indicators in research, teaching and administration through an evaluation rubric. The Department encourage impact by directly giving credits in the rubric or through individual review to activities, which can generate economic and social impact, such as industrial grants, patents, government funding for technological developments to encourage research work with impact on industry.

Hire staff with contact with industry and potential impact on society: The impact potential of the research areas and the research program of the new recruits are carefully evaluated during the recruitment process. We try to identify areas which will have scientific as well as application impact such as biophysics and quantum information.

Engage the Knowledge Transfer Office (KTO): In CityU, the KTO is fully responsible for all matters related to intellectual property and commercial of intellectual property through licensing or spin-offs. We engage the help of KTO through introducing their services to staff, so as to set up an environment conducive to bringing out the impact of our research on the society.

Promote the use of scattering technique for characterization of materials for regional industry: The neutron scattering facility in Dongguan will have impact on the Hong Kong and Guangdong society if industry and the society know about the potential of the facility and can make use of the facility. A $17million investment was made by RGC and CityU in a new powerful instrument there and CityU is going to establish a new material laboratory and new campus nearby. We will exploit this advantage by promoting the facility to industry and the public, such as forming user groups, organizing industrial seminars or workshops and public lectures, which explain the functions of the neutron scattering facility.

Encourage inter-disciplinary collaboration research with other department or universities: Physics research techniques can provide deeper understanding and different perspectives. Through collaboration with other disciplines, physicists can produce research achivement with higher impact. MRI is a good example of the marriage of magnetic resonance and medicine. The Physics Department are equipped with $37million worth of equipment and received $30million internal funding in the last two years. Our research capability can enhance the impact of other departments' research. We therefore encourage more interdisciplinary research activities through provision of financial support.

(4) Relationship to case studies

The impact case study is the direct consequence of our awareness and emphasis of impact in our research. The neutron scattering group was established with the vision that the technique can have important applications in other non-physics and non-academic areas, such as chemistry, medicine, material technology and biotechnology. The research success of our neutron scattering group has already brought about a change in the regional governments' attitude towards scientific research by showing them what can be achieved with the facility