

(For JSPS Fellow)

Form B-5

Date (日付) 20/10/2014

(Date/Month/Year: 日/月/年)

Activity Report -Science Dialogue Program-
(サイエンス・ダイアログ事業 実施報告書)

- Fellow's name (講師氏名): Luca Chiari _____ (ID No. P14027)

- Participating school (学校名): Ichikawa Gakuen Senior High School _____

- Date (実施日時): 17/10/2014 _____ (Date/Month/Year: 日/月/年)

- Lecture title (講演題目): (in English) Antimatter-Matter Interactions _____

(in Japanese)

- Lecture summary (講演概要): Please summary your lecture 200-500 words.

An introduction to the Research Fellow was given at the beginning of the lecture. The Research Fellow's country of origin and local cultures and traditions were introduced in a comparison to Japan. A description of the languages spoken in his home region and a brief historical overview was provided to the audience. The Research Fellow's academic and professional careers from the beginning of his University studies to present day were also briefly presented.

In the remainder of the lecture the Research Fellow presented and discussed his research subject, namely Antimatter-Matter Interactions. An introduction to the concept of antimatter in comparison to ordinary matter was first given. The antiparticle of the electron, that is the positron, was introduced and its theoretical postulation and experimental discovery were discussed. The origin of antimatter in the Universe was then presented and its interaction with ordinary matter to annihilate each other and produce energy was also explained. The advantages and potential applications of antimatter, but also its production cost and technological challenges in storing it, were briefly debated. The "barion asymmetry", that is the apparent imbalance between matter and antimatter in the universe, is one of the greatest unsolved problems in physics. The useful applications of antimatter-matter interactions in scientific disciplines were mentioned, with particular emphasis on its uses in bio-medical practice, such as Positron Emission Tomography (PET). The Research Fellow's previous research topic of investigating radiation damage induced by ionising radiation in biomolecular systems, by measuring cross sections for positron scattering from molecules of biological relevance, was discussed in detail. Finally the capacity of the positron to bind an electron and form positronium, or to bind two electrons and form the positronium negative ion, was also presented in conjunction with a brief description of the work being undertaken at Tokyo University of Science. At the end of the lecture a cloud chamber experiment with each group of students was carried out in order to explain the principles of the detection of ionising radiation.

- Language used (使用言語): English _____

- Lecture format (講演形式):

◆Lecture time (講演時間) 45 min (分), Q&A time (質疑応答時間) 20 min (分)

◆Lecture style (ex.: used projector, conducted experiments)

(講演方法 (例: プロジェクター使用による講演、実験・実習の有無など))

Presentation using projector followed by group experiment

◆Interpretation (ex.: assistance by accompanied person, provided Japanese explanation by yourself) (通訳 (例: 同行者によるサポート、講師本人による日本語説明))

Hardly ever needed, but when needed was provided by accompanying person

◆Name and title of accompanied person (同行者 職・氏名)

Prof. Yasuyuki Nagashima

◆Other note worthy information (その他特筆すべき事項):

- Impressions and opinions from accompanied person (同行者の方から、本事業に対する意見・感想等がありましたら、お願いいたします。):