（**For JSPS Fellow**）

Form B-5

Date（日付）
　09/07/2015　　（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）:　　　Shizuoka Prefectural Iwata Minami High School　　　

- Date （実施日時）:　08/07/2015　　　　　　　　　（Date/Month/Year：日/月/年）

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

　　　　　　　　　　　　　　（in Japanese）　　反物質と物質の相互作用

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

At the beginning of the lecture I gave a short introduction about myself, why I am in Japan, where I live and what I do for a job. Then I introduced my country of origin, my hometown, the local culture, traditions, sports and food in comparison to Japan. I described the variety of regional languages spoken in Italy and my home region and explained the historical reasons for the existence of these dialects. I presented my educational and academic career with a description of the institutions where I have studied and worked, as well as the places around the world where I have lived. Finally I briefly explained my reasons for becoming a physicist.

In the remainder of my lecture I presented the general subject of my research field, namely antimatter-matter interactions. I defined the concept of antimatter in comparison to ordinary matter and explained what matter and antimatter are made of by giving some specific examples, such as the hydrogen and antihydrogen atoms. I introduced the simplest antiparticle, namely the antiparticle of the electron (the positron) and gave a brief historical overview of its theoretical postulation and experimental discovery. I described the sources of antimatter in the universe and how antimatter interacts with ordinary matter: they annihilate with each other and produce energy. The advantages and potential applications of antimatter, but also its production cost and technological challenges in storing it, were also briefly debated. Then I introduced one of the greatest unsolved problems in physics, the so-called "baryon asymmetry", that is the apparent imbalance between matter and antimatter in the universe. I mentioned the numerous useful applications of antimatter-matter interactions in various scientific disciplines, with particular emphasis on its use in the biomedical practice, such as for Positron Emission Tomography (PET) scans. I discussed about my research on cross section measurements for positron interactions with the biomolecules present in the cell components. I explained how that data can be used to investigate any potential charged-particle induced damage in biomolecular systems. Finally I introduced more complicated examples of antimatter, namely the positronium atom and the

positronium negative ion, and how they can be produced. I explained how these species will be used to produce a new positronium beamline that is currently under construction and testing at Tokyo University of Science.

- Language used（使用言語）: __English__

- Lecture format（講演形式）:
  ◆Lecture time（講演時間） __80__ min（分）, Q&A time（質疑応答時間） __30__ 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__
  ◆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））
      __Provided some keywords in Japanese in the presentation__
  ◆Name and title of accompanied person（同行者 職・氏名）

  ◆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。）: