

(For JSPS Fellow)

Form B-5

Date (日付)

29/June/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): Yeong Liang (William) LING (ID No. P13740)- Participating school (学校名): Hikawa High School, Yamanashi-shi (山梨県立日川高等学校)- Date (実施日時): 22/June/2015 (Date/Month/Year: 日/月/年)

- Lecture title (講演題目):

(in English) Orbital Mechanics: How to get to space, stay there, and move around(in Japanese) 軌道力学: 宇宙に行き, そこに留まったり周回したりするための方法

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

Most people in the general public lack a good understanding of the boundaries of *space* and the procedures for launching satellites and spacecraft into orbit. This lecture described in simple terms the differences between *sub-orbital* and *orbital* spaceflight, as well as giving a basic background of the requirements needed to place something into orbit. Simple and intuitive analogies were used to describe orbital insertion and orbital transfers. A real-life example going through the process of a Russian Soyuz spacecraft travelling to the International Space Station was used to demonstrate the practical applications of the information presented.

Our modern life depends on many satellites such as GPS, television, and mobile communication satellites. These usually weigh several thousand kilograms. Recently, small satellites weighing less than 100 kg, and even less than 10 kg, have become common. However, there is a lack of suitable propulsion systems (engines) for these small satellites. Without this, they are not able to move around.

My research topic is in the design and testing of a promising electric propulsion system called a *pulsed plasma thruster*. It works by discharging plasma at very high speeds (up to ~20 kilometres a second), producing a force that will let small satellites move around. A brief overview of the operation of pulsed plasma thrusters was presented in the lecture, along with the motivation and aims behind the research. The differences between chemical rocket engines and electric propulsion were also presented, as well as reasons for why one may be preferred over the other depending on the situation.

- Language used (使用言語): English

- Lecture format (講演形式):

◆Lecture time (講演時間) 70 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))

Projector and oral delivery.

◆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))

Assistance by accompanying person to repeat complicated concepts in Japanese.

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

浅川 純 (Mr.)

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

N/A

- 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。):

この事業は高校生にとっては大変良い経験になると思います。少なくとも私は高校生のときにこのような経験をしたかったと感じました。

高校生側と講演者との間での質疑応答等のやりとりがもう少し活発になるような工夫があればさらに良くなると思いました。