

(For JSPS Fellow)

Form B-5

Date (日付) 17/02/2018 (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): Chanchal Sow (ID No. P17027)
- Participating school (学校名): Jonan Ryoso High School
- Date (実施日時): 31/01/2018 (Date/Month/Year: 日/月/年)
- Lecture title (講演題目): (in English) Magnetism of Calcium Ruthenate under DC Current.  
(in Japanese) 直流電流下でのカルシウムルテニウム化合物の磁性
- Lecture summary (講演概要): Please summary your lecture 200-500 words.

There were 3 parts of my lecture.

**1st part:** First I introduced about myself. Then I talked about my country, different types of indian cultures. Its a large country with many languages, religions, festivals, food habits, tourist spots. Then I talked about the Nobel Laureates from India, explain about the indian education systems and so on.

**2nd part:** I discussed about the importance of asking questions, importance of english language, what is superstitions and why science is important. Science is present in everywhere around us at every length-scales (atomic size to light years). Then I explain about why do material have resistance and what is Ohms law? Then concept of resistivity, low temperature, Kelvin temperature scale, liquid nitrogen, liquid helium, Metal, semiconductor, Insulator, superconductor are explained. In my childhood, I was very much attracted to the magnets like a piece of iron does. I was amazed by the magnetism phenomena and asked the question "why?" to myself. This eventually lead to choose my carrier in science, physics, and finally magnetism.

**3rd part:** I explained about the origin of magnetism starting from the concept of atoms, electrons, magnetic moments (spins). Then the concept of ferromagnetism and diamagnetism with live demonstrations. In daily life we use water, wood, plastic, copper (10 Yen coin). These are diamagnetic materials. All these materials will be repeled by the magnet. We demonstrated that wood, plastic and copper (10 Yen coin) are repelled (diamagnetic) if you take a piece of magnet very near to it. But this repulshive force is very weak. Thus we float those objects in water and demonstrated the presence of weak repulsive force with a piece of magnet very close to those floating objects. We also conducted diamagnetic levitation experiments with ghaphite sheets.

Finally I showed my research work which is related to diamagnetism. We found that calcium ruthenate under a few-mA DC current becomes highly diamagnetic. We named that phenomena as "giant diamagnetism". Recently our discovery of current controlled giant diamagnetism in  $\text{Ca}_2\text{RuO}_4$  is published in Science journal (Science **358**, 1084 (2017)).

- Language used (使用言語): English

- Lecture format (講演形式): Lecture-60 min, Demonstration-30 min

◆Lecture time (講演時間) 60+30 (分), Q&A time (質疑応答時間) 20 (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))

Used projector, Conducted experiments

◆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 accompanied person

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

Mr. Ryo Numasaki (M2 student, Kyoto univ)

◆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。):

**理論的な内容は高校生の皆さんにとっては少し難しかったかもしれませんが、少しでも理解しようと真剣に聞いてくれていましたし、実験も楽しそうに参加していただけなので、とても有意義な講義となったと思います。**