Web 掲載用

SD4717
※弊会記入欄

（学校用）

様式 A-1
(FY2025)

2026 年 1 月 31 日

サイエンス・ダイアログ　実施報告書

1. 学校名：京都府立城南菱創高等学校

2. 講師氏名：Dr. Srijon Ghosh

3. 講義補助者氏名：なし

4. 実施日時：2026 年 1 月 26 日 （月）11：45 ～ 12：35

5. 参加生徒：　３年生　０人、　２年生　２２人、　１年生　０人 （合計　２２人）
（備考：普通科の物理選択生徒）

6. 講義題目：Light, Molecules, and Life: Motions at Ultrafast Timescales

7. 講義概要：①インドについて　②ご自身の研究内容

8. 講義形式：
☑対面 ・ □オンライン （どちらか選択ください。）
   1) 講義時間　４０分　質疑応答時間　１０分

   2) 講義方法（例：プロジェクター使用による講義、実験・実習の有無など）
      プロジェクター使用による講義

   3) 事前学習
      ☑有 ・□ 無 （どちらか選択ください。）
      使用教材：講師の方から事前に送られた講義の要約やキーワードリスト

9. その他特筆すべき事項：
   特になし

Form B-2
(FY2025)
Must be typed

Date （日付）03/02/2026 （Date/Month/Year：日/月/年）

Activity Report -Science Dialogue Program-

（サイエンス・ダイアログ 実施報告書）

- Fellow's name（講師氏名）: SRIJON GHOSH
（ID No. P24338 ）

- Name and title of the lecture assistant（講義補助者の職・氏名）
None

- Participating school（学校名）: Kyoto Prefectural Jonan Ryoso High School

- Date （実施日時）: 26/01/2026
（Date/Month/Year:日/月/年）

- Lecture title（講義題目）:
Light, Molecules, and Life: Motions at Ultrafast Timescales

- Lecture format（講義形式）:
  - ◆☒Onsite ・ ☐Online (Please choose one.)（対面 ・ オンライン）（（どちらか選択ください。））
  - ◆Lecture time（講義時間） 40 min（分）, Q&A time（質疑応答時間） 10 min（分）
  - ◆Lecture style（ex.: used projector, conducted experiments）
（講義方法（例：プロジェクター使用による講義、実験・実習の有無など））
Used projector

- Lecture summary（講義概要）: Please summarize your lecture within 200-500 words.

As part of the JSPS Science Dialogue program, I delivered a lecture titled "Light, Molecules, and Life: Motions at Ultrafast Timescales" to students at Kyoto Prefectural Jonan Ryoso High School on January 26, 2026. The purpose of the lecture was to introduce basic concepts of light–matter interaction and ultrafast molecular motion, while encouraging interest in science among high school students. The session began with a brief overview of my home country, India, including its geographical and cultural diversity and long-standing contributions to global science. I highlighted the role of ancient and modern Indian scientists in advancing fields such as mathematics, physics, and medicine. This was intended to foster cross-cultural understanding and demonstrate how scientific ideas have evolved in different parts of the world. I then provided a short summary of my academic background, outlining the path from undergraduate studies in chemistry to doctoral research and my current position as a postdoctoral researcher at Kyoto University under JSPS funding. This part was shared to help students understand the structure of academic careers and the importance of international collaboration in science.

The scientific portion of the lecture began by introducing physical chemistry as the field that studies how energy interacts with matter at the molecular level. I explained the nature of light as both a wave and a particle, and introduced the electromagnetic spectrum. Through familiar examples such as solar cells, vision, and photosynthesis, I showed how light is absorbed and used by biological systems. Next, I discussed the effect of ultraviolet (UV) light, which carries more energy than visible light. While visible light is essential for life, UV radiation can damage biological molecules, especially DNA. I briefly introduced the double-helix structure of DNA and explained how base pairing (A–T and G–C) stabilizes the genetic code. When DNA absorbs UV light, this energy must be safely dissipated. If not, chemical bonds may break or rearrange, causing mutations and potentially leading to diseases such as skin cancer. To investigate these processes, I introduced the concept of ultrafast molecular motion. Molecular reactions can occur on timescales as short as femtoseconds (10^{-15} seconds) or attoseconds (10^{-18} seconds), much faster than the blink of an eye. I explained that conventional tools cannot resolve such events, and that ultrafast laser spectroscopy is required to “see” molecular changes in real time.

I then explained my research method, time-resolved vibrational spectroscopy. In this technique, a UV laser pulse excites the molecule, and a delayed infrared (IR) pulse records its vibrations. By varying the time delay, a dynamic picture of molecular motion is constructed. This method is used to study how nucleobases in DNA react immediately after absorbing UV light, with the goal of understanding the earliest steps in photodamage and how molecules avoid or repair it. The lecture concluded by highlighting the importance of fundamental research in uncovering the mechanisms that protect life at the molecular level. Students were encouraged to stay curious, ask questions, and explore science beyond the classroom.

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

None


What is light? (光とは何ですか)
THE ELECTROMAGNETIC SPECTRUM
A form of energy (エネルギー)
It travels as waves (波) and can also act like particles (粒子)
The electromagnetic spectrum represents the types of light