

様式 A-1

2026 年 6 月 10 日

サイエンス・ダイアログ 実施報告書

1. 学校名: 福井県立若狭高等学校
2. 講師氏名: Dr. Nicolo Zenoni
3. 講義補助者氏名: 藤木 恒成
4. 実施日時: 2026 年 6 月 9 日 (火) 14:20 ~ 16:10
5. 参加生徒: 2 年生 32 人(合計 32 人)
備考: 理数探究科の生徒
6. 講義題目: Black Holes: the Ultimate Computers
7. 講義概要: ブラックホール研究の概要とコンピュータとの関連性
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 90 分 質疑応答時間 10 分
2) 講義方法
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: 物理の教科書、NotebookLM による語い確認ツール
9. その他特筆すべき事項:

Form B-2

Date (日付) 10/06/2026

(Date/Month/Year: 日/月/年)

Must be typed

Activity Report -Science Dialogue Program-

(サイエンス・ダイアログ 実施報告書)

1. Fellow's name (講師氏名): Nicolo ZENONI (ID No. P25332)
2. Name and title of the lecture assistant (講義補助者の職・氏名)
Kosei Fujiki, Graduate student
3. Participating school (学校名): Wakasa High School
4. Date (実施日時): 09/06/2026 (Date/Month/Year: 日/月/年)

5. 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) 85 min (分), Q&A time (質疑応答時間) 15 min (分)
 - ◆ Lecture style (e.g., 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))

Slide presentation with projector, interactive real-time pools/quiz/Q&A for students by the free software Slido, discussions among students in groups of 3-4 people throughout the lecture, use of simple tools (magnets, towel and weight) to visually explain some Physics concepts

6. Lecture title (講義題目):

Black Holes: The Ultimate Computers

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

The lecture was divided into two parts of 50 minutes each, with a break of 10 minutes in between. As an icebreaker, I introduced my hometown (local food, soccer team...).

I then talked about my personal background in academia, comparing the Italian system and the Japanese one, and explained the reasons why I chose to become a researcher. Throughout the first part of the lecture, I also shared some of my experiences in Japan and some personal thoughts on what it means to be a researcher in Physics.

The second part of the lecture focused on my research. I started by presenting the four fundamental interactions and commented on how gravity, the weakest and most common in our everyday experience, is still not fully understood. The students were asked to rank the four interactions from the strongest to the weakest by a live poll, and some considerations on the correct answer were concretely shown by using magnets. With the help of some students, I then explained the core idea of General Relativity by showing the deformation of a towel under the effect of a weight. Finally, I introduced black holes and supported the explanation by displaying

the recent pictures taken by the Event Horizon Telescope.

In the last part of the lecture, I engaged the students with a more advanced question on the conservation of information falling into a black hole, which led to the idea that a black hole stores information like a hologram. After discussion in groups of 3-4 people, the students individually answered a quiz, whose result was commented. The use of a QR code to participate in the quiz bridged the explanation of what a hologram is and how information can be stored in lower dimensions, as a QR code does.

The lecture was ended with the recent view of a black hole as the fastest computer in Nature.

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

The most technical parts of the slides were written both in English and Japanese, so that the students could compare the English and the Japanese scientific language.

Some of the core ideas were repeated in Japanese by the lecture assistant right after the English explanation, to consolidate the comprehension of students of both the English and the scientific aspects.

The lecture was paused several times to allow discussions in small groups. This way, the students could make sure they understood the key points.

The students were encouraged to ask questions at any time during the lecture. A Q&A webpage was also kept open for the full duration of the lecture, so that the students could freely type questions at any time without feeling intimidated. I was glad that most of the questions were anyway spoken aloud during the lecture.

I was also very happy that all the students actively participated in the live polls and the majority guessed the right answers.

The attendance of the President, Vice-President, and two Teachers of the School was greatly appreciated.

9. Impressions and comments from the lecture assistant (講義補助者の方から、本プログラムに対する意見・感想等がありましたら、お願いいたします。):

Many students listened to the lecture with great interest. I hope they were able to get a sense of what life as a researcher is like, as well as what aspects of the world our field is interested in and what kind of philosophy guides our pursuit of the truth of the universe.

This outreach experience has also become very meaningful to me. Thank you very much.

