

SD

※弊会記入欄

Form B-2  
(FY2022)  
Must be typed

Date (日付)  
23/09/2022 (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): LUCY OLIVIA MCNEILL (ID No. P21017)

- Name and title of the lecture assistant (講義補助者の職・氏名)  
Not applicable

- Participating school (学校名): AICHI KARIYA PREFECTURAL HIGH SCHOOL

- Date (実施日時): 21/09/2022 (Date/Month/Year: 日/月/年)

- Lecture title (講義題目):  
Learning about the life of stars with gravitational wave astronomy

- 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) 90 min (分), Q&A time (質疑応答時間) 30 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 own laptop connected to projector for slides and animations

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

All stars, including the Sun, spend millions of years powered by the nuclear burning of hydrogen into helium. Once they run out of fuel, stars shed their outer layers, sometimes exploding as a supernova. After this, stars spend their life as extremely compact stellar remnants.

Most stars in our Milky Way Galaxy will end their lives as white dwarfs. But the most rare, most massive stars end their lives as neutron stars, or black holes. And most stars are in binaries, so that many will eventually become a compact binary.

Einstein's theories predict that if binaries containing two compact objects orbit each other, they make waves in spacetime itself. These are called gravitational waves, and their signals can even be detected here on Earth.

For example, in 2015, the first binary black hole merger from a very far away Galaxy was detected by the LIGO detector in the US.

In this lecture, we will learn about how stars burn their fuel, and how they eventually become compact remnants after energetic events such as supernova explosions. Then we will learn about the modern day understanding of gravity, guided by Einstein's theories. We will see how these theories have been verified by various astronomical observations.

With the topics discussed in the lecture so far, I will finally tell you about my research! At Kyoto University we are thinking about future gravitational wave observations of compact binaries in the Milky Way. In particular, we are designing analysis techniques to learn about things like supernova explosions and tidal forces in compact binaries, as well as the origin of elements in the Milky Way.

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

- Impressions and comments from the lecture assistant (講義補助者の方から、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。):

Not applicable