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## 主頁和搜索

The screenshot shows the IOPscience website homepage. At the top, there is a navigation bar with 'IOPscience', 'Journals', 'Books', 'Publishing Support', and 'iopsciencetrial'. A search bar is located on the right side of the navigation bar. Below the navigation bar, the main content area is divided into several sections. On the left, there is a 'Welcome to IOPscience' section with a call to action to find out more about IOPscience, IOP Publishing, and IOPcorporate. In the center, there is a 'Latest news and articles' section with three news items: 'Congratulations to the 2017 Physics laureates Rajarshi Barish and Kin S. Kim', 'IOP Publishing launches Remarq pilot on a number of journals', and 'IOP Publishing launches Journal of Physics Communications'. On the right, there is a 'Customer services' section with contact information for librarians. At the bottom, there is a 'Featured journals' section with six journal covers: metrologia, NANOTECHNOLOGY, New Journal of Physics, Nonlinearity, epl, and nuclear fusion. There are three callout boxes with Chinese text: one pointing to the 'Welcome to IOPscience' section, one pointing to the search bar, and one pointing to the 'Librarians' section.

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## 論文查找頁面

The screenshot shows the IOPscience search interface. At the top, there is a navigation bar with 'IOPscience', 'Journals', 'Books', 'Publishing Support', and 'Login'. A search bar contains 'Search IOPscience content' and a 'Search' button. To the right is an 'Article Lookup' dropdown. Below this, a search filter is set to '2D Mater. (2014 - present)', with fields for 'Volume', 'Issue', and 'Article or page', and a 'Lookup' button. A callout box points to this area: '這裡您可以選擇通過瀏覽期卷期查找論文'.

On the left, a 'Refine your search' sidebar includes 'Apply filters', 'Clear filters', and expandable sections for 'Date published', 'Journals', 'Authors', and 'Publication type'. A callout box points to this sidebar: '如果您希望對出版時間、期刊、作者和出版類型加以限制，可以勾選這裡的核取方塊'.

The main content area displays 'The top 500 results for "" are:' followed by 'Within: Anytime'. On the right, there are links for 'Email alert', 'RSS search', and a 'Sort by: Relevance' dropdown. A callout box points to the 'Sort by' dropdown: '可以通過相關性和時效性對搜索結果進行排序'.

The search results list several 'JOURNAL ARTICLE' entries. The first entry is 'Prospects of III-nitride optoelectronics grown on Si' by D Zhu, D J Wallis and C J Humphreys, published in 2013 *Rep. Prog. Phys.* **76** 106501. Below the title and authors are links for '+ View abstract', 'View article', and 'PDF'.

## 學科選集

The screenshot shows the IOPscience website navigation menu. The 'Journals' dropdown menu is open, displaying several options: Journals list, IOPselect, Review articles, Subject collections, Publishing partners, and IOP Conference Series. A callout box with a black border and white background is overlaid on the 'Subject collections' option. The callout box contains the following text: '學科選集' (Subject Collections) and '將滑鼠移動到頁面上方的期刊部分，點擊旁邊的三角形，選擇Subject Collection 就可以進入到我們的學科選集頁面。' (Move the mouse to the journal part at the top of the page, click the triangle next to Subject Collection, and you can enter our subject collection page.)

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**學科選集**

將滑鼠移動到頁面上方的期刊部分，點擊旁邊的三角形，選擇Subject Collection 就可以進入到我們的學科選集頁面。

**A**

- Advances in Natural Sciences: Nanoscience and Nanotechnology
- Applied Physics Express
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**B**

- Biofabrication
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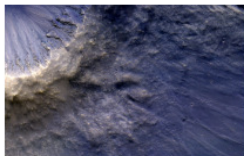
**N**

- Nano Express
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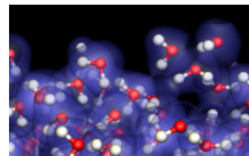
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### Subject collections

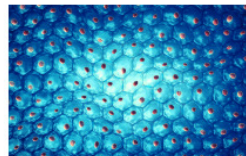
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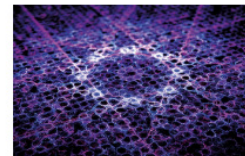
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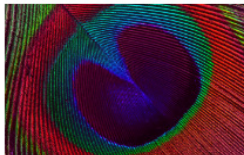
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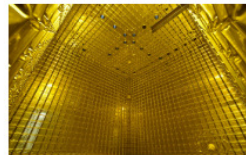
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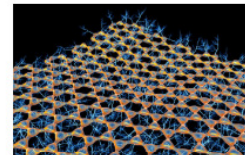
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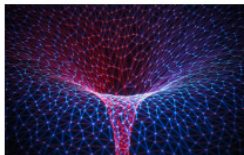
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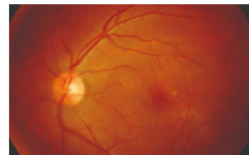
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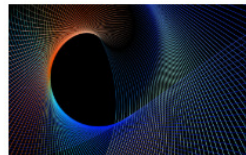
Materials



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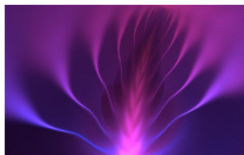
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- Materials for Quantum Technology
- Materials Research Express
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2D Materials

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## Increasing the light extraction and longevity of TMDC monolayers using liquid micro-lens

C S Woodhead<sup>1</sup>, J Roberts<sup>1</sup>, Y J K Novoselov<sup>2</sup> and R J Young<sup>1</sup>

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[2D Materials, Volume 4, Number 1](#)

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### Abstract

The recent discovery of semiconducting two-dimensional materials is predicted to lead to the introduction of a series of revolutionary optoelectronic components that are just a few atoms thick. Key remaining challenges for producing practical devices from these materials lie in improving the coupling of light into and out of single atomic layers, and in making these layers robust to the influence of their surrounding environment. We present a solution to tackle both of these problems simultaneously, by deterministically placing an epoxy based micro-lens directly onto the materials' surface. We show that this approach enhances the photoluminescence of tungsten diselenide (WSe<sub>2</sub>) monolayers by up to 300%, and nearly doubles the imaging resolution of the system. Furthermore, this solution fully encapsulates the monolayer, preventing it from physical damage and degradation in air. The optical solution we have developed could become a key enabling technology for the mass production of ultra-thin optical devices, such as quantum light emitting diodes.

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## 2D Materials

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### Increasing the light extraction and longevity of TMDC monolayers using liquid formed micro-lenses

C S Woodhead<sup>1</sup>, J Roberts<sup>1</sup>, Y J Noori<sup>1</sup>, Y Cao<sup>1</sup>, R Bernardo-Gavito<sup>1</sup>, P Tovee<sup>1</sup>, A Kozikov<sup>2</sup>, K Novoselov<sup>2</sup> and R J Young<sup>1</sup>

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### Abstract

The recent discovery of semiconducting two-dimensional materials is predicted to lead to the

layers robust to the influence of their surrounding environment. We present a solution to tackle both of these problems simultaneously, by deterministically placing an epoxy based micro-lens directly onto the material. This approach enhances the photoluminescence of tungsten diselenide (WSe<sub>2</sub>) by up to 300%, and nearly doubles the imaging resolution of the system. Furthermore, this solution fully encapsulates the monolayer, preventing it from physical damage and degradation in air. The optical solution we have developed could become a key enabling technology for the mass production of ultra-thin optical devices, such as quantum light emitting diodes.

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## 圖書頁面

Evolutionary Dynamics  
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Written for researchers and postgraduate students with a background in physics or applied mathematics and a desire to apply their skills to problems in the life sciences, this beautifully illustrated and stimulating book develops an understanding of the gene-to-trait problem in the context of evolutionary dynamics, from the modern perspective of integrative biology. The gene-to-trait problem resides at the heart of a great many questions in biology. The author presents both elementary and advanced material in a way that brings out how this gene-to-trait problem is treated in the contexts of bioinformatics and evolutionary dynamics. Key ideas and techniques that underlie some of the most-used bioinformatics methods are discussed in an integrative context and a wide range of examples of mathematical models of living things is developed in an evolutionary framework.

Author  
Hugo van den Berg

Published  
July 2016

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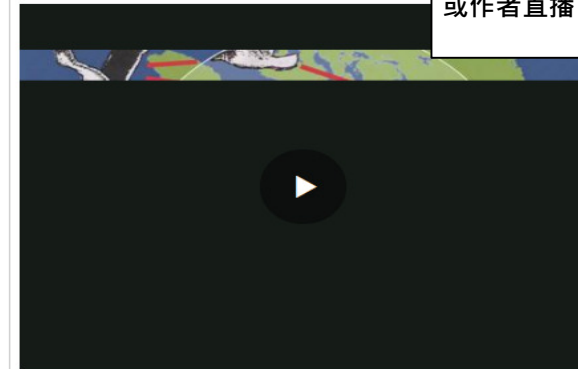
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### Climate Change Resilience in the Urban Environment

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Tristan Kershaw

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Pages 1-1 to 1-27

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#### Abstract

In this chapter we examine the origins of the natural greenhouse effect and the role different atmospheric gases play in creating the Earth's climate. We then consider how anthropogenic emissions are altering the status quo and how scientist try to predict how the weather and climate of the future may be altered.

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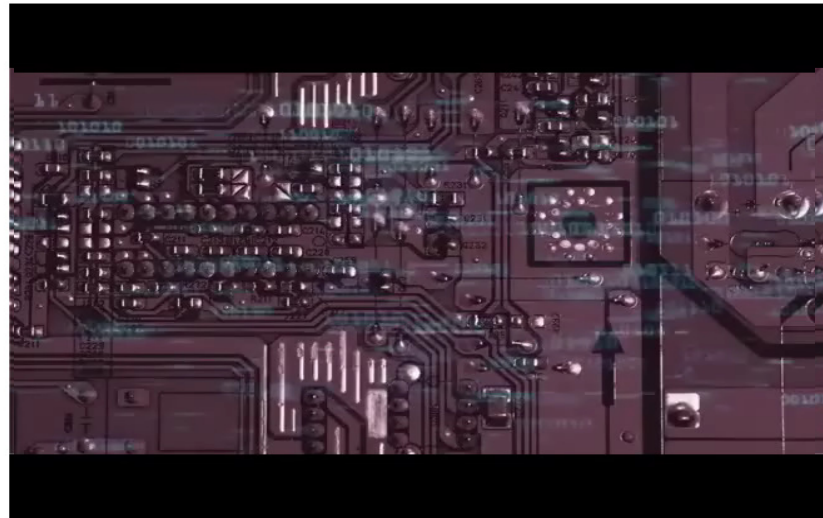
Climate is a difficult concept for people to deal with, as generally we think in terms of short-term variations or weather, and our memory is drawn towards more extreme events such as heat waves, cold snaps, and storms. Climate, however, is defined as the long-term averages and ranges of different

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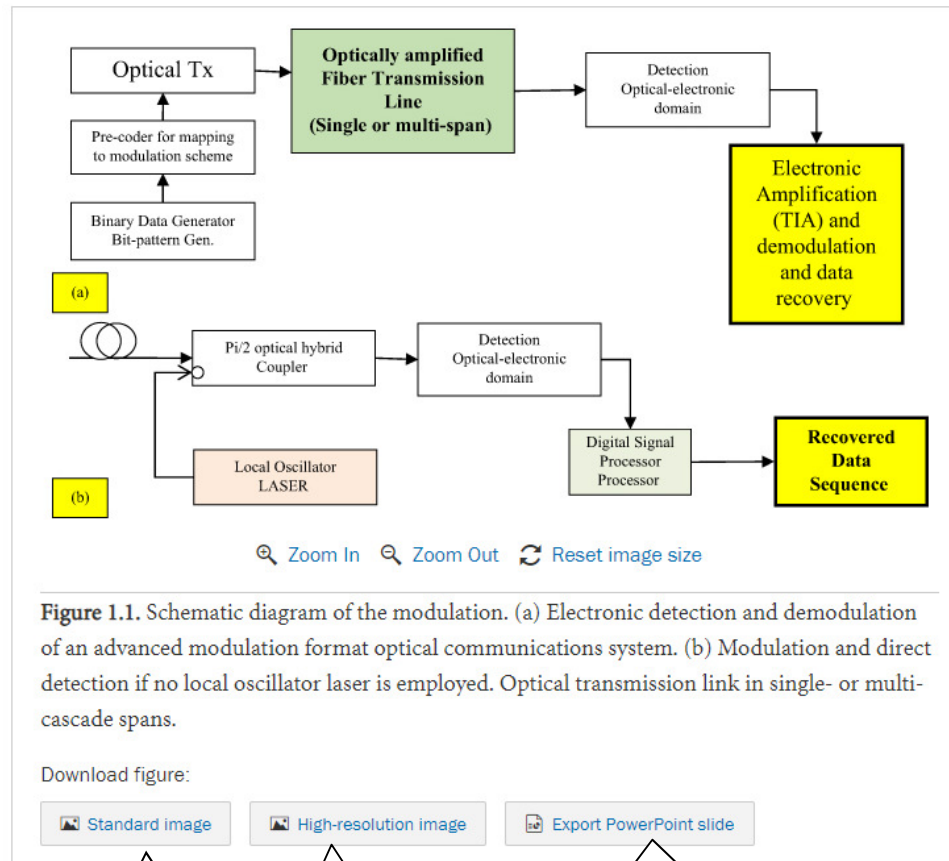
that has given us this high technology life. This is nicely illustrated by Professor Jesper Nygård in the video of figure 1.1. Several research technologies are discussed in this video, and we will treat many of them in the following chapters of this book.



**Figure 1.1.** Jesper Nygård on nanotechnology, artificial atoms, and the future of computing. (Video hosted by Professor [Jesper Nygård](#), Neils Bohr Institute, and produced by the Compound for Neils Bohr Institute, included [here](#) with their permission.)

## 平臺功能亮點

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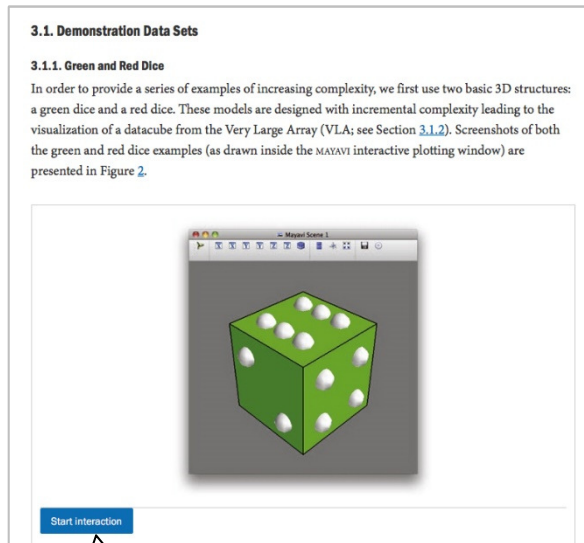
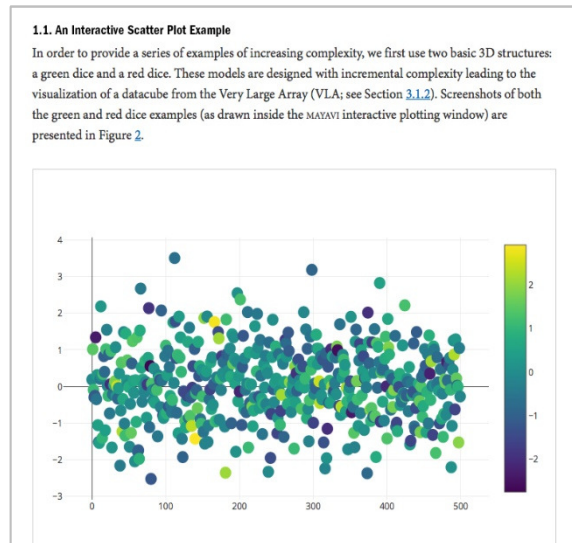
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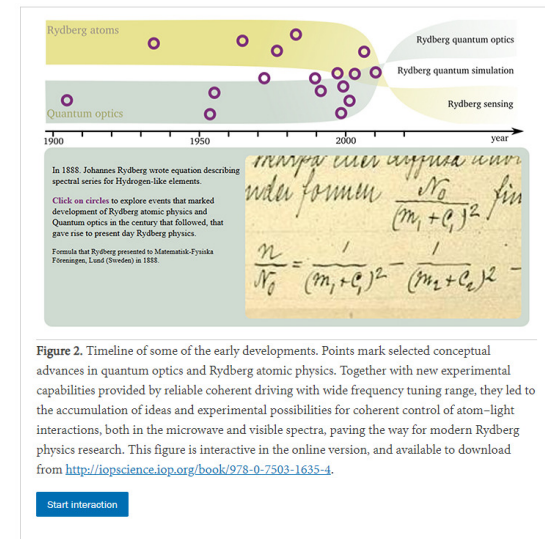


## 平臺功能

### 互動式圖表



點擊圖片下方“開始交互”按鈕，即可對圖片進行個性化操作



**Figure 2.** Timeline of some of the early developments. Points mark selected conceptual advances in quantum optics and Rydberg atomic physics. Together with new experimental capabilities provided by reliable coherent driving with wide frequency tuning range, they led to the accumulation of ideas and experimental possibilities for coherent control of atom-light interactions, both in the microwave and visible spectra, paving the way for modern Rydberg physics research. This figure is interactive in the online version, and available to download from <http://iopscience.iop.org/book/978-0-7503-1635-4>.

Habitable zones in multiple star systems

Binary **Multiple**
Render Clear

**Star A** ✕

Temperature: 5780 K

Luminosity: 1.0  $L_{\text{solar}}$

Mass: 1.0  $M_{\text{solar}}$

Position X: 4 AU

Position Y: 0.0 AU

**Star B** ✕

Temperature: 3600 K

Luminosity: 0.3  $L_{\text{solar}}$

Mass: 0.104  $M_{\text{solar}}$

Position X: 0.5 AU

Position Y: 1 AU

**Star C** ✕

Temperature: 8700 K

Luminosity: 4  $L_{\text{solar}}$

Mass: 1.5  $M_{\text{solar}}$

Position X: 3 AU

Position Y: 2 AU

+

Star	Temperature	Luminosity	Mass	X	Y
A	5780 K	1 $L_{\text{solar}}$	1 $M_{\text{solar}}$	4 AU	0 AU
B	3600 K	0.3 $L_{\text{solar}}$	0.104 $M_{\text{solar}}$	0.5 AU	1 AU
C	8700 K	4 $L_{\text{solar}}$	1.5 $M_{\text{solar}}$	3 AU	2 AU

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**Parameters**

Model: Kopparapu et al. (⌵)

Plot region: min/max X/Y (⌵)

Minimum X: -5 AU

Maximum X: 5 AU

Minimum Y: -5 AU

Maximum Y: 5 AU

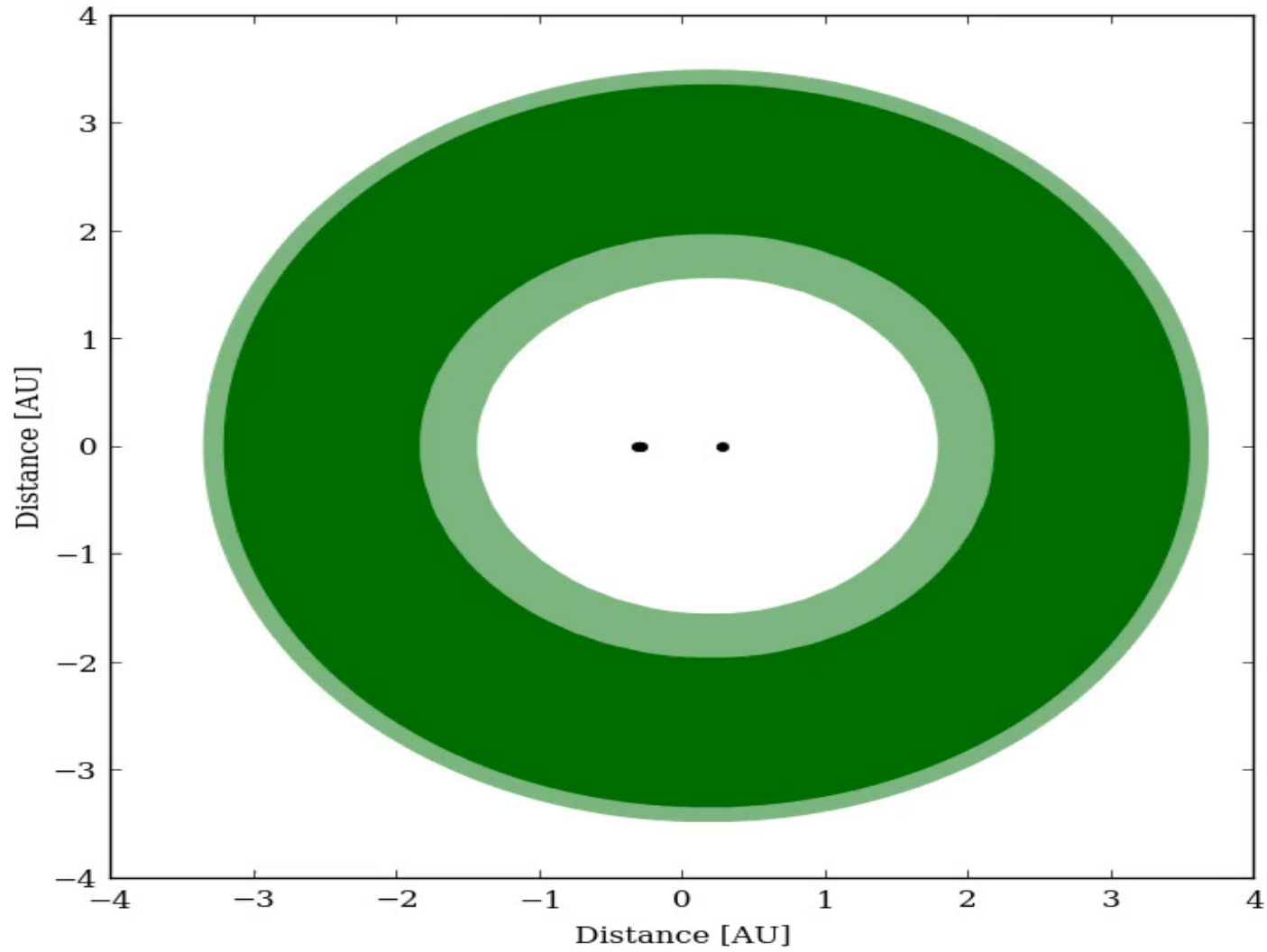
Aspect Ratio: 1

Resolution: 0.05 AU

Center on center of mass

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## 平臺功能

### 交互問答 - 習題

#### 1.9. Exercises

##### Exercise 1:

1. The metric on the sphere is given by

$$d\Omega^2 = d\theta^2 + \sin^2 \theta d\phi^2. \quad (1.174)$$

Compute the non-zero components of the Christoffel symbol.

2. Compute the non-zero components of the Riemann tensor and the Ricci tensor. Compute the Ricci scalar.  
3. Recall that the metric in polar coordinates on  $R^3$  is given by

$$ds^2 = dr^2 + r^2 d\Omega^2. \quad (1.175)$$

The components of this metric are independent of  $\varphi$ . Determine the Killing vector associated with rotation around the  $z$  axis with angle  $\varphi$ .

4. Determine the Killing vectors associated with rotations on the sphere. Hint: use  $\partial_x$ ,  $\partial_y$ , and  $\partial_z$  as basis elements.

##### Solution 1:

1.  $\Gamma_{\phi\phi}^{\theta} = -\sin \theta \cos \theta$ ,  $\Gamma_{\theta\phi}^{\phi} = \cot \theta$ .
2.  $R_{\phi\theta\phi}^{\theta} = \sin^2 \theta$ ,  $R_{\theta\phi\theta}^{\phi} = \sin^2 \theta$ .  
 $R_{\theta\theta} = 1$ ,  $R_{\phi\phi} = \sin^2 \theta$ ,  $R_{\theta\phi} = 0$ .  
 $R = 2$ .
3.  $R = \partial_{\varphi} = -y\partial_x + x\partial_y = (-y, x, 0)$ .
4.  $T = (\vec{r} \times \vec{\partial})_x = (0, -z, y)$ .  
 $S = (\vec{r} \times \vec{\partial})_y = (z, 0, -x)$ .

點擊圖片中的“Solution”按鈕查看答案

##### Exercise 2:

The metric on the hyperboloid  $H^2$  (Poincaré half-plane) is given by

$$ds^2 = \frac{r^2}{y^2}(dx^2 + dy^2). \quad (1.176)$$

## 平臺功能

### 匯出公式

The screenshot shows the IOPscience website interface. At the top, there is a navigation bar with 'IOPscience', 'Journals', 'Books', 'Publishing Support', and 'Login'. A search bar is present with the text 'Search IOPscience content' and a 'Search' button. Below the navigation bar, the page title is 'Lectures on General Relativity, Cosmology and Quantum Black Holes'. The main content area displays 'CHAPTER 1 • FREE TO READ' and 'General relativity essentials' by Badis Ydri. There are buttons for 'PDF chapter' and 'ePub chapter'. A 'Turn on MathJax' button is highlighted with a red box, and a callout bubble points to it with the text '點擊“Turn on MathJax” 開啟MathJax功能'. Other elements include 'Table of contents', 'Next chapter', 'Export citation and abstract' (with BibTeX and RIS buttons), and a 'Related content' section.

#### 1.6.1. Tidal gravitational forces

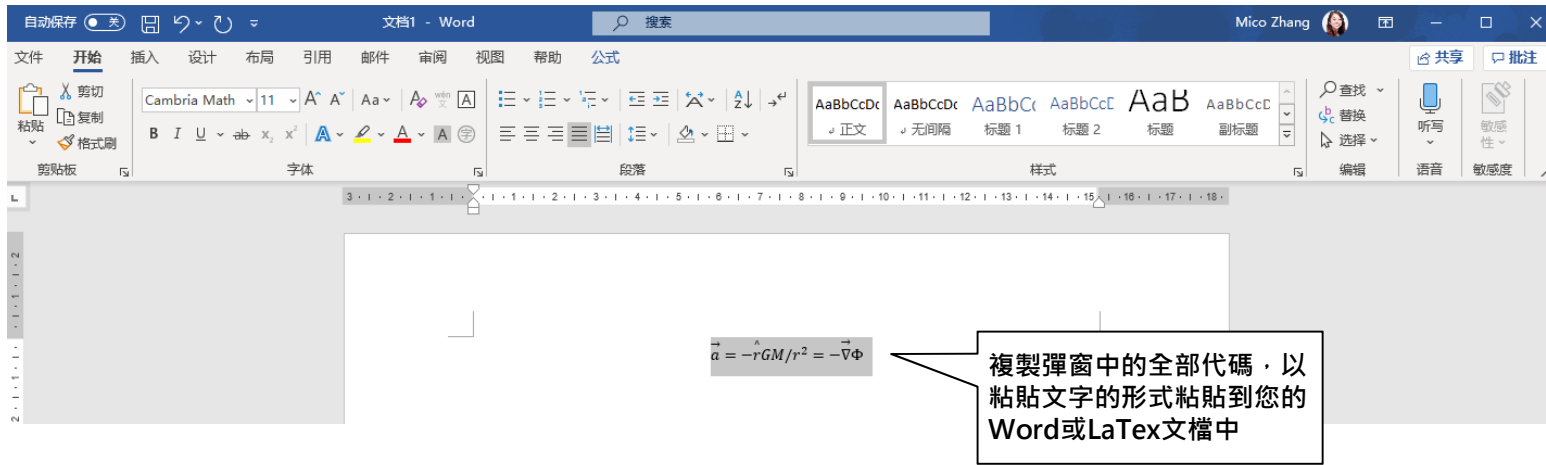
Let us first start by describing tidal gravitational forces in Newtonian physics. The force of gravity exerted by an object of mass  $M$  on a particle of mass  $m$  a distance  $r$  away is  $\vec{F} = -\hat{r}GMm/r^2$ , where  $\hat{r}$  is the unit vector pointing from  $M$  to  $m$  and  $r$  is the distance between the center of  $M$  and  $m$ . The corresponding acceleration is  $\vec{a} = -\hat{r}GM/r^2 = -\nabla\phi$ , where  $\phi = -GM/r$ . We assume now that the mass  $m$  is spherical of radius  $\Delta r$ . The distance between the center of  $M$  and the center of  $m$  is  $r$ . The force of gravity exerted by the mass  $M$  on a particle of mass  $m$  is given by  $\vec{F} = -\hat{r}GMm/r^2$ .

$$\vec{a} = -\hat{r}GM \frac{1}{(r + \Delta r)^2} = -\hat{r}GM \frac{1}{r^2} \left(1 - \frac{2\Delta r}{r} + \dots\right) \quad (1.99)$$

The screenshot shows a context menu for a mathematical formula. The menu items are: 'Show Math As', 'Math Settings', 'Accessibility', 'Language', 'About MathJax', and 'MathJax Help'. The 'Show Math As' option is highlighted with a red box, and a callout bubble points to it with the text '滑鼠右鍵點擊公式，選擇“Show Math As”'.

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