科技寫作(Scientific Writing)

Week 8 (Nov. 01 – Dec. 28)

Discussion Section

1. “Mainly” based on your own measurement
2. Context with existing studies
3. Consider who are your readers

1. “Mainly” based on your own measurement
2. Context with existing studies
3. <u>Consider who are your readers</u>

Who are your readers?

Who are your readers?

You Define!

潛在讀者群

1. **會議交流中碰到**
2. **arXiv或其它文獻資料庫**
3. **被引用後，它人循引用索引到**
4. **論文口試委員~~根本不會看你的論文~~**

潛在讀者群(以新手碩博士生而言)

1. 會議交流中碰到 **(No interaction, no readers! Go to meetings!)**

   (最大宗)

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(若title及abstract夠有趣，可能可以吸引一些)

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arXiv browsing

(若title及abstract夠有趣，可能可以吸引一些)

(一般讀者順位: 大咖作者=有趣文章 > 同領域相關文章 > 同領域不相關文章)

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arXiv > astro-ph

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Astrophysics

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- Cross-lists
- Replacements

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New submissions (showing 90 of 90 entries)

[1] arXiv:2512.03120 [pdf, html, other]

Enhanced slow magnetic-Coriolis waves with magnetic field orthogonal to rotation axis

Raviraj Narayan Shinde, Ghanesh Narasimhan

Subjects: **Solar and Stellar Astrophysics (astro-ph.SR)**; Earth and Planetary Astrophysics (astro-ph.EP); Atmospheric and Oceanic Physics (physics.ao-ph); Fluid Dynamics (physics.flu-dyn); Space Physics (physics.space-ph)

We consider an isolated Gaussian velocity vortex perturbation in an otherwise quiescent, electrically conducting, and rotating fluid permeated by a uniform magnetic field $\mathbf{B}$. Studies suggest a presence of strong azimuthal wave motions on the timescale of centuries within the Earth's liquid outer core at higher latitudes. To understand these long-period oscillations, we focus on magnetostrophic waves, a slow component of magnetic-Coriolis waves with $\mathbf{B}$ orthogonally aligned with the rotation vector $\mathbf{\Omega}$, which replicate the field lines in the azimuthal direction. We present an analytical solution to the magnetic-Coriolis wave equation in Cartesian coordinates. Later, with numerical solution, we validate our analytical estimates and show that magnetostrophic waves travel relatively faster along the magnetic field when $\mathbf{B} \perp \mathbf{\Omega}$ compared with the case when both are aligned. The study confirms that with a magnetic field $\mathbf{B}$ orthogonally aligned to the rotation vector $\mathbf{\Omega}$, wave vectors satisfying the condition $\mathbf{\Omega} \cdot \mathbf{k} \approx \mathbf{0}$, travel with Alfvén velocities along the magnetic field lines as a component of inertial-Alfvén waves. The timescales on which Alfvén waves travel are relatively short, and it is also less likely that inertial-Alfvén waves will be sustained inside the core at higher latitudes \citep{Davidson2017}. This study shows that, excluding the inertial-Alfvén waves contribution ($k_z \neq 0$), there exists intensified magnetostrophic wave propagation when $\mathbf{B} \perp \mathbf{\Omega}$, which can explain the strong periodic oscillations on the time scales of centuries along the azimuthal field at higher latitudes. Results show persistence of the magnetostrophic waves despite the lower Lehnert number Le, suggesting the plausible existence of a low-intensity azimuthal magnetic field in the Earth's core.

[2] arXiv:2512.03128 [pdf, other]

Characterization of debris disks observed with SPHERE

N. Engler, J. Milli, N. Pawellek, R. Gratton, P. Thébault, C. Lazzoni, J. Olofsson, H. M. Schmid, S. Ulmer-Moll, C. Perrot, J.-C. Augereau, S. Desidera, G. Chauvin, M. Janson, C. Xie, Th. Henning, A. Boccaletti, S. B. Brown-Sevilla, E. Choquet, C. Dominik, M. Samland, A. Zurlo, M. Feldt, T. Fusco, C. Ginski, J. H. Girard, D. Gisler, R. G. van Holstein, M. Langlois, A.-L. Maire, D. Mesa, P. Rabou, L. Rodet, T. Schmidt, A. Vigan

Comments: 57 pages, 33 figures, 13 tables

Subjects: **Earth and Planetary Astrophysics (astro-ph.EP)**

This study aims to characterize debris disks observed with SPHERE across multiple programs, with the goal of identifying systematic trends in disk morphology, dust mass, and grain properties as a function of stellar parameters. We analyzed a sample of 161 young stars using SPHERE observations at optical and near-IR wavelengths. Disk geometries were derived from ellipse fitting and model grids, while dust mass and properties were constrained by modified blackbody (MBB) and size distribution (SD) modeling of SEDs. The dynamical modeling was performed to assess whether the observed disk structures can be explained by the presence of unseen planets. We resolved 51 debris disks, including four new detections: HD 36968, BD-20 951, and the inner belts of HR 8799 and HD 36546. In addition, we found a second transiting giant planet in the HD 114082 system, with a radius of 1.29 $\mathrm{R_{Jup}}$ and an orbital distance of ~1 au. We identified nine multi-belt systems, with outer-to-inner belt radius ratios of $1.5-2$, and found close agreement between scattered-light and millimeter-continuum belt radii. They scale weakly with stellar luminosity ($\mathrm{R_{belt}} \propto \mathrm{L_{\star}^{0.11}}$), but show steeper dependencies when separated by CO and CO_2 freeze-out regimes. Disk fractional luminosities follow collisional decay trends, declining as $\mathrm{t_{age}^{-1.18}}$ for A and $\mathrm{t_{age}^{-0.81}}$ for F stars. The inferred dust masses span $10^{-5} - 1\,\mathrm{M_{\oplus}}$ from MBB and $0.01 - 1\,\mathrm{M_{\oplus}}$ from SD modeling. These masses scale as $\mathrm{R_{belt}^{n}}$ with $\mathrm{n} > 2$ in belt radius and super-linearly with stellar mass, consistent with trends seen in protoplanetary disks. Analysing correlation between disk polarized flux and IR excess, we found an offset of ~1 dex between total-intensity (HST) and polarized fluxes. A new parametric approach to estimate dust albedo and maximum polarization fraction is introduced.

arXiv browsing

(I need 5~10 seconds to understand the Title)

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[10] **arXiv:2512.03143** [**pdf**, **html**, **other**]

Infrared emission from $z \sim 6.5$ quasar host galaxies: a direct estimate of dust physical properties

M. Costa, R. Decarli, F. Pozzi, P. Cox, R. A. Meyer, A. Pensabene, B. P. Venemans, F. Walter, F. Xu

Comments: 18 pages, 10 figures, accepted for publication on A&A

Subjects: **Astrophysics of Galaxies (astro-ph.GA)**

Quasars at the dawn of Cosmic Time ($z > 6$) are fundamental probes to investigate the early co-evolution of supermassive black holes and their host galaxy. Nevertheless, their infrared spectral energy distribution remains at the present time poorly constrained, due to the limited photometric coverage probing the far-infrared wavelength range where the dust modified black-body is expected to peak (~ 80 μm). Here we present a study of the high-frequency dust emission via a dedicated ALMA Band 8 (~400 GHz) campaign targeting 11 quasar host galaxies at $6 < z < 7$. Combined with archival observations in other ALMA bands, this program enables a detailed characterization of their infrared emission, allowing for the derivation of dust masses (M_d), dust emissivity indexes (β), dust temperatures (T_d), infrared luminosities (L_{IR}), and associated star formation rates (SFRs). Our analysis confirms that dust temperature is on average higher in this sample (34-65 K) if compared to local main-sequence galaxies' values, and that this finding can be linked to the increased star formation efficiency we derive in our work, as also suggested by the $[CII]_{158\mu m}$ deficit. Most remarkably, we note that the average value of T_d of this sample doesn't differ from the one that is observed in luminous, ultra-luminous and hyper-luminous infrared galaxies at different redshifts that show no signs of hosting a quasar. Finally, our findings suggest that the presence of a bright AGN does not significantly bias the derived infrared properties, although further high-frequency, high-spatial resolution observations might reveal more subtle impacts on sub-kiloparsec scales.

arXiv browsing

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arXiv browsing

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You may lose people at "hello"!

Think carefully about what (1~2) keywords need to be in your title, in order to engage certain readers.
Think carefully about what "full title" can maintain their attention.
Think carefully about what abstract can make them prioritize reading your paper!

arXiv browsing

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I only read the abstract if the title interests me;
I only read the content if I think I should prioritize reading this paper;
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You will engage some readers, not all.
You are writing to those specific readers.

潛在讀者群(以新手碩博士生而言)

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(近乎沒有)

寫作Discussion Section時，設想
(1) 可能會去哪些會議接觸哪些人
(2) Title及Abstract想要吸引哪類讀者
針對他們的背景能力及興趣寫作
(e.g., 針對dark energy community寫作Type Ia supernova測量)

1. <u>“Mainly” based on your own measurement</u>
2. <u>Context with existing studies</u>
3. Consider who are your readers

常見寫作Discussion Section問題:

1. 討論寫成Introduction，跟自己的測量脫鉤
2. 沒有呼應問題，沒有建立跟領域研究的關聯

流程

Introduction

Discussion

Method

Results

流程. (立下Section titles!)

Introduction

Discussion

Method

Results

流程

Introduction

1. 提出問題
2. 概述解決方法

Method

Results

Discussion

流程

Introduction

1. 提出問題
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Method

1. 詳述方法

Results

Discussion

流程

Introduction

1. 提出問題
2. 概述解決方法

Discussion

Method

1. 詳述方法

Results

1. 具體測量結果

流程

Introduction

1. 提出問題
2. 概述解決方法

Method

1. 詳述方法

Results

1. 具體測量結果

Discussion

呼應問題

流程

Introduction

1. 提出問題
2. 概述解決方法

Discussion

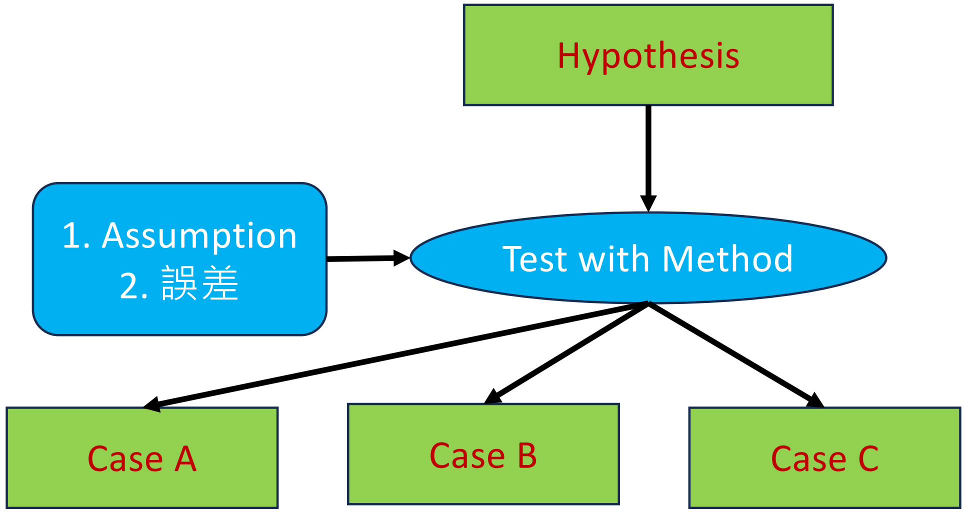
呼應問題

Method

1. 詳述方法

Results

1. 具體測量結果



流程

Introduction

1. 提出問題
2. 概述解決方法

Discussion

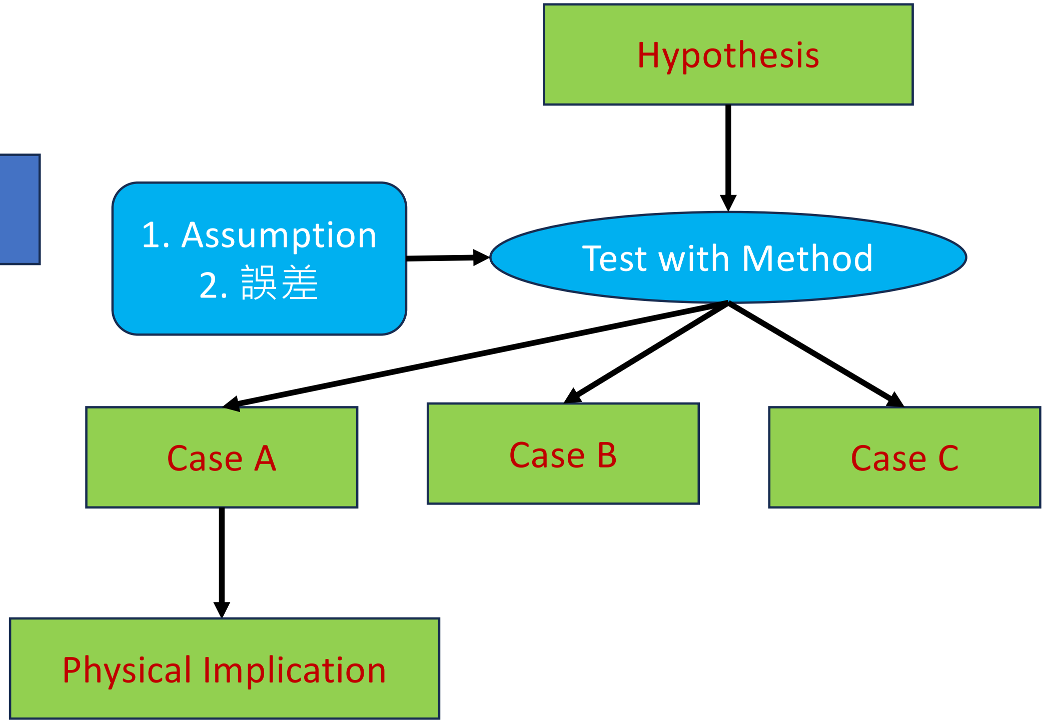
呼應問題

Method

1. 詳述方法

Results

1. 具體測量結果



流程

Introduction

1. 提出問題
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Method

1. 詳述方法

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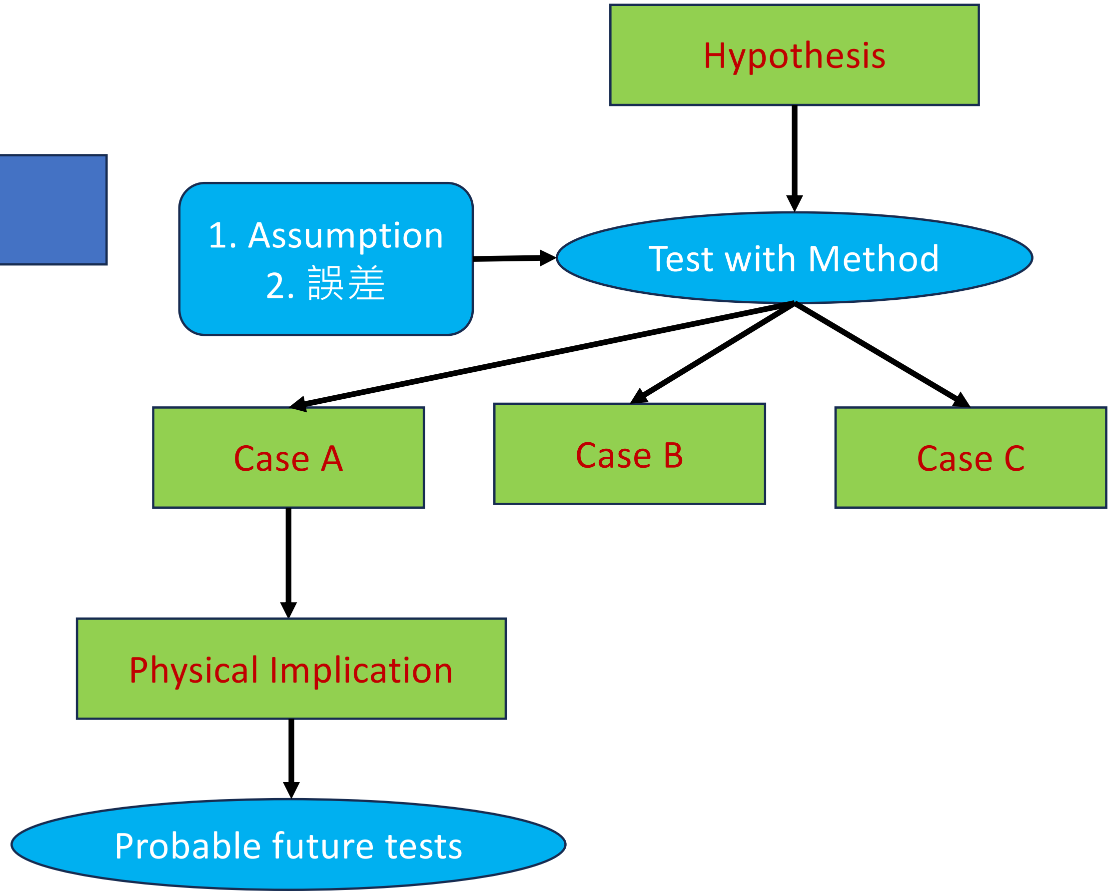


流程

Introduction

1. 提出問題
2. 概述解決方法

Method

1. 詳述方法

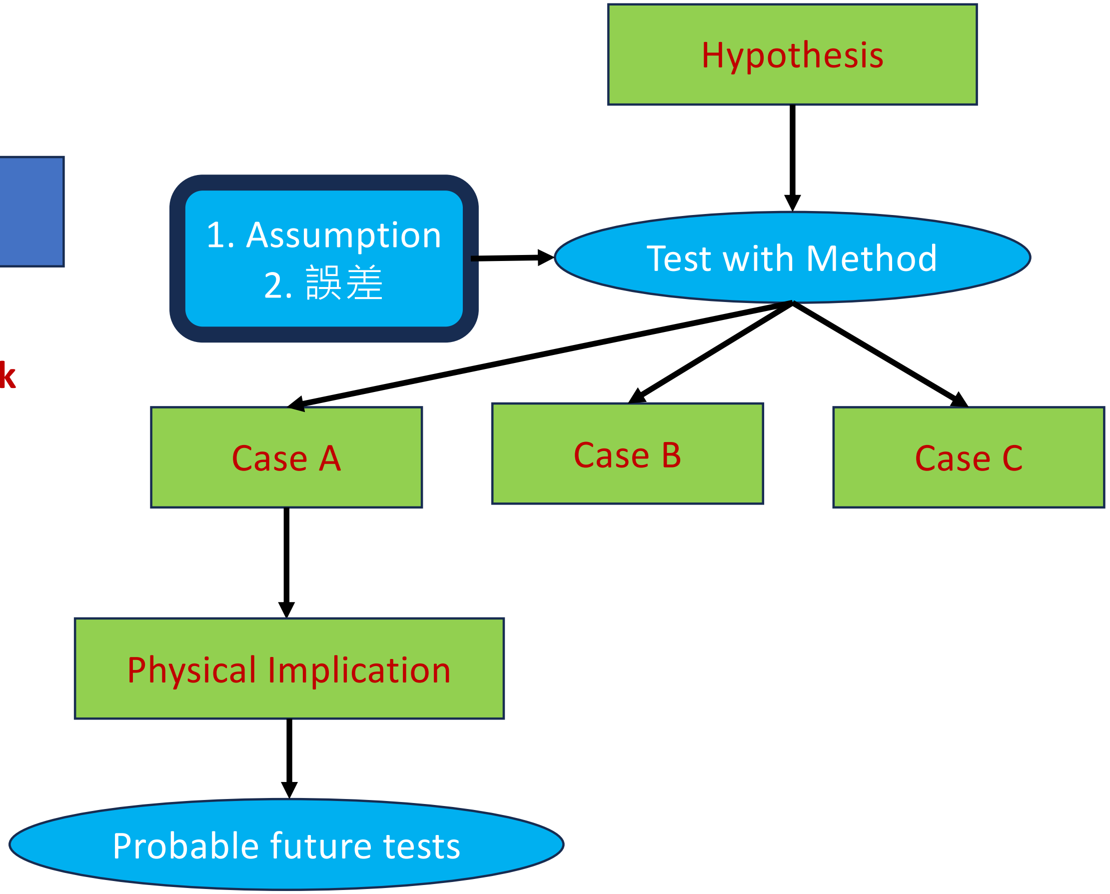
Results

1. 具體測量結果
2. **熱噪聲討論**

Discussion

呼應問題

1. 若Assumption break down如何影響結論



流程

Introduction

1. 提出問題
2. 概述解決方法

Method

1. 詳述方法

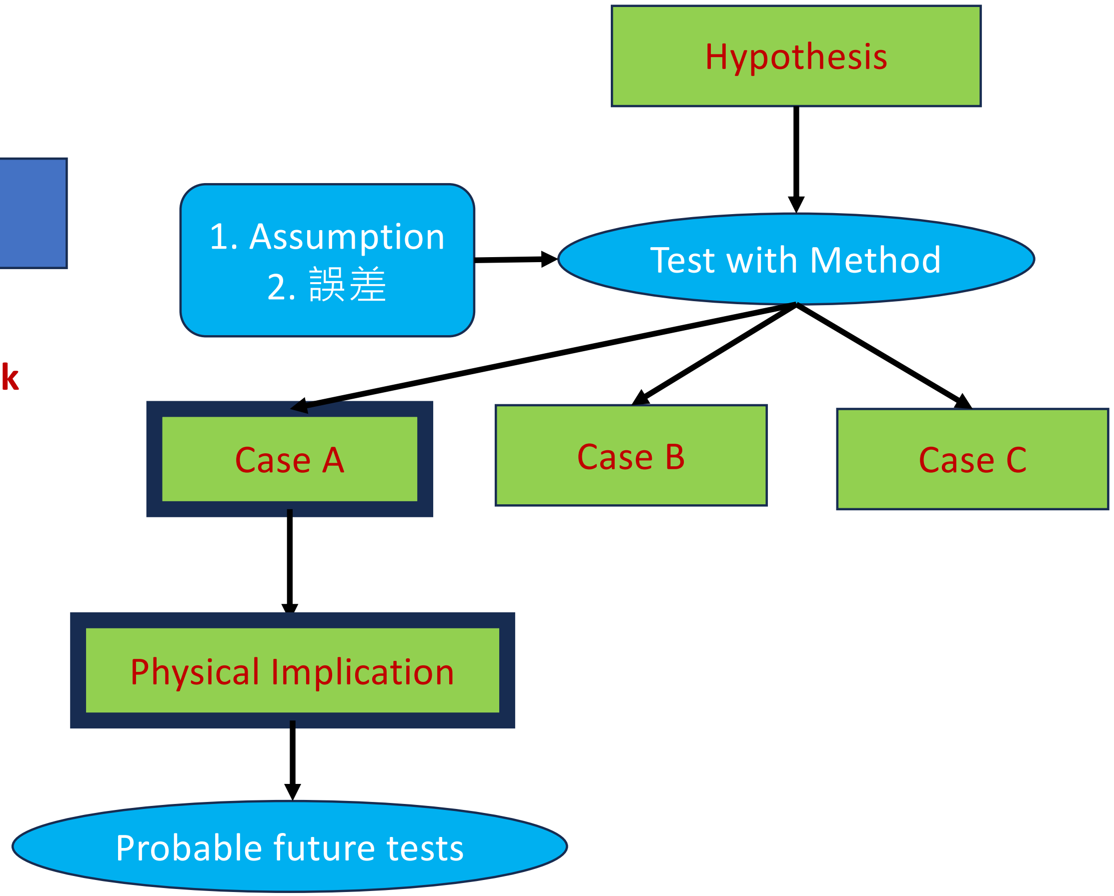
Results

1. 具體測量結果
2. **熱噪聲討論**

Discussion

呼應問題

1. 若Assumption break down如何影響結論
2. 測量結果對應到什麼物理圖像



流程

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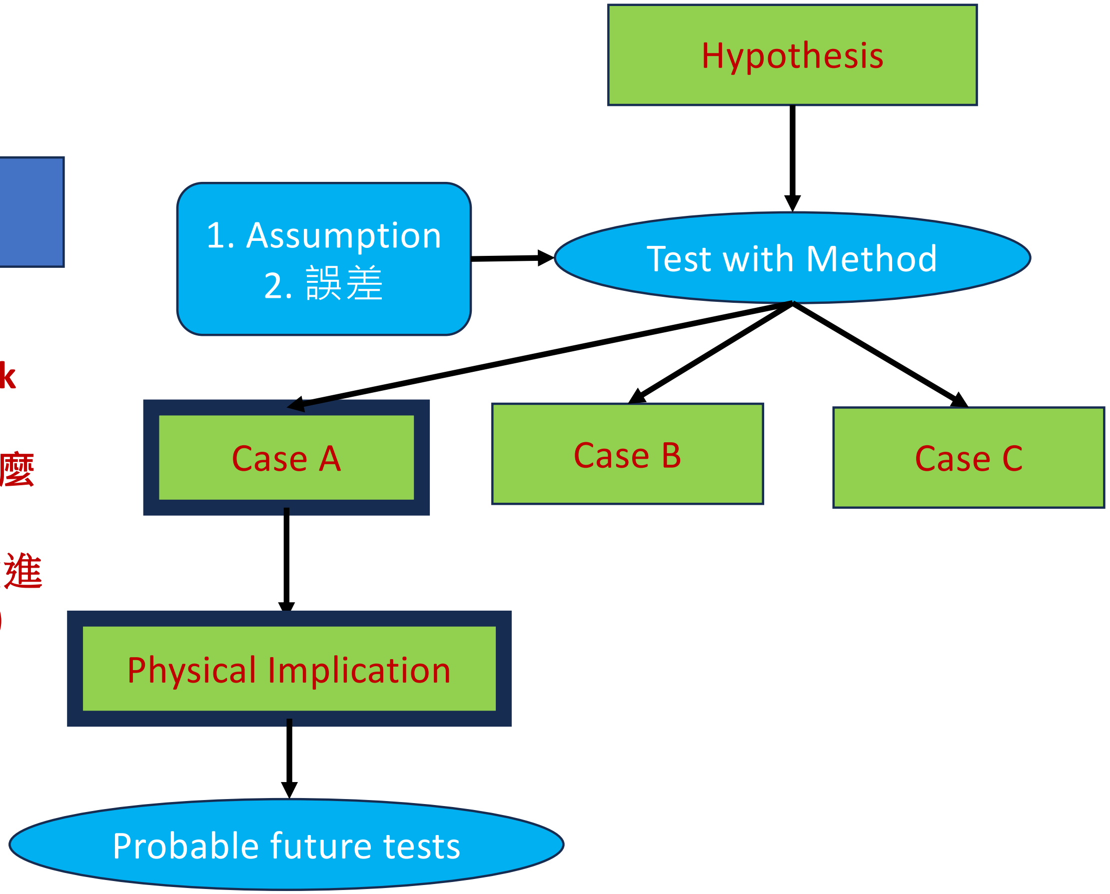

流程(實例)

Introduction

1. 電子具有波動性？$\lambda = h/p$

2. 雙狹縫實驗

Method

1. 詳述方法

Results

1. 具體測量結果
2. 熱噪聲討論

Discussion

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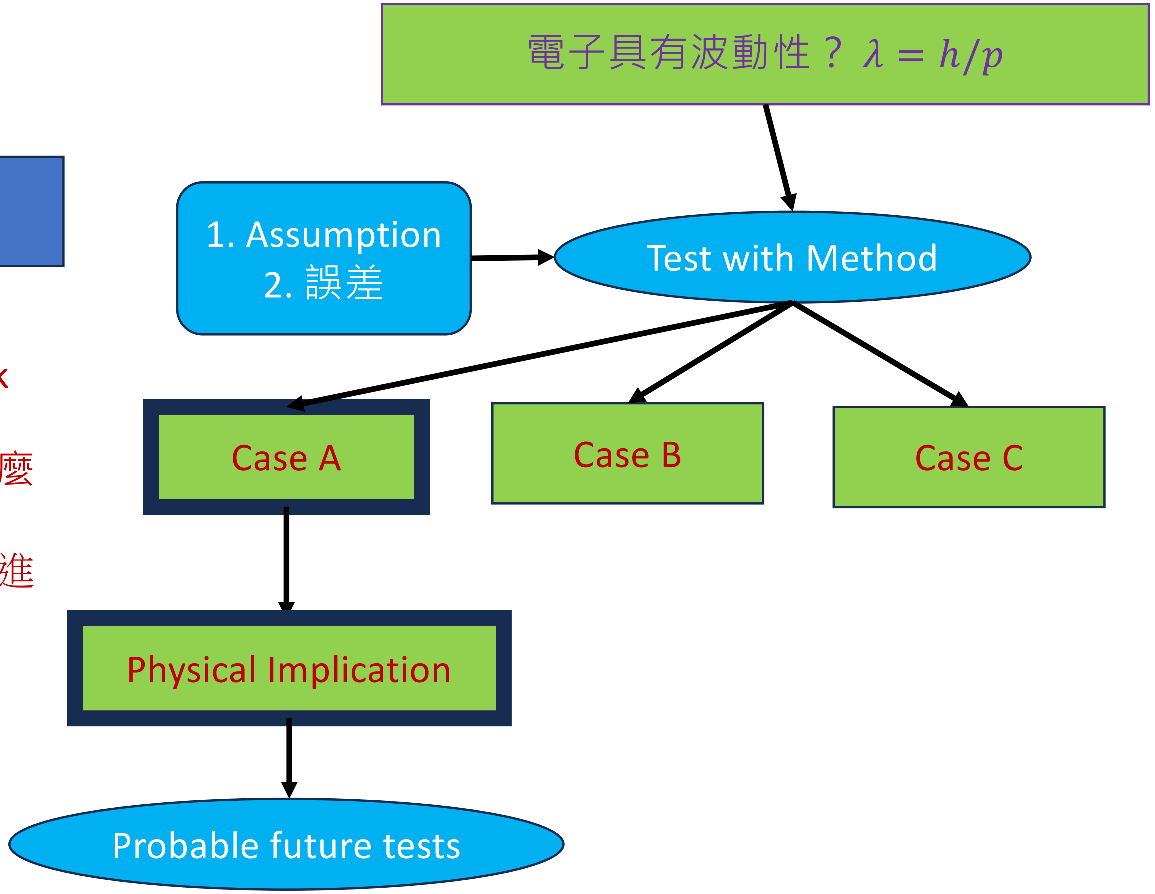

流程(實例)

Introduction

1. 電子具有波動性？$\lambda = h/p$

2. 雙狹縫實驗

Method

1. 用什麼device作為屏幕
2. 如何generate具特定動量的電子束

Results

1. 具體測量結果
2. 熱噪聲討論

Discussion

呼應問題

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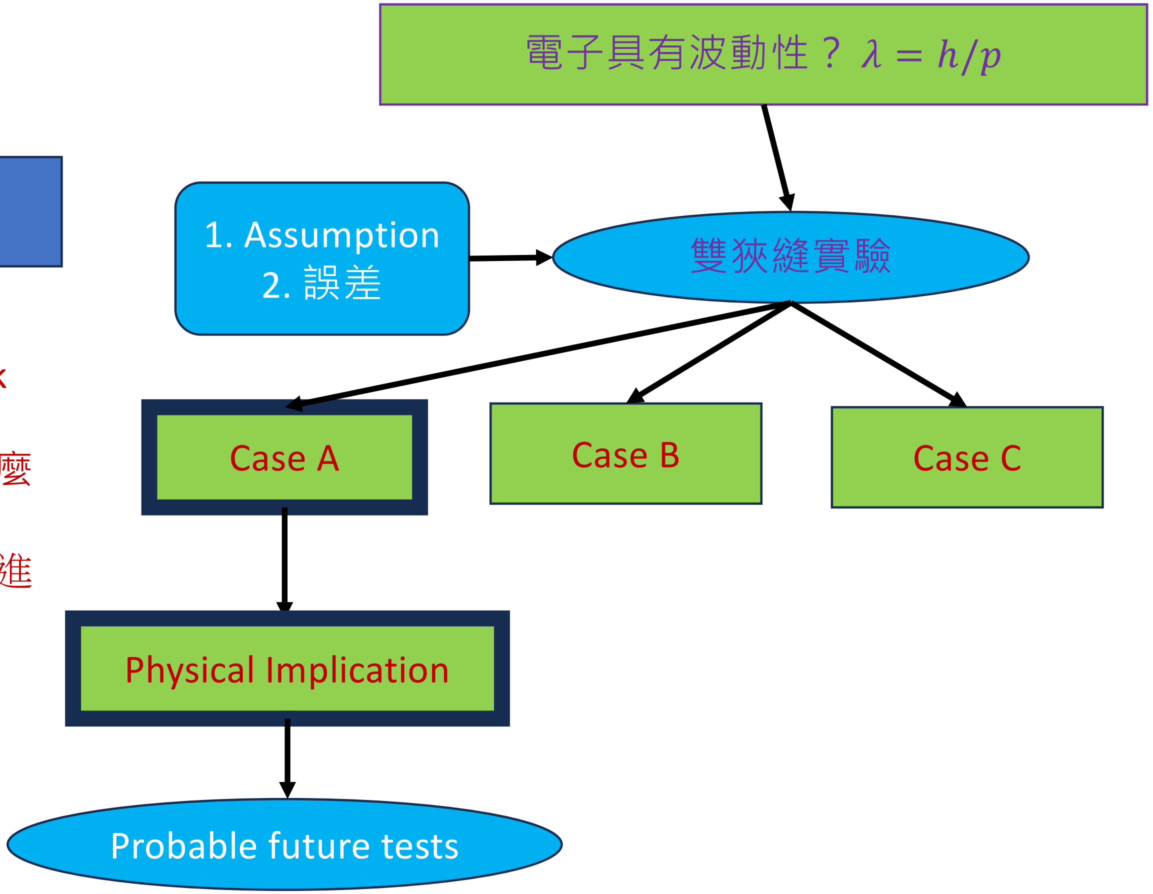

流程(實例)

(sub-section titles及每個paragraphs的第一個sentence)

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1. 具體測量結果
2. 熱噪聲討論

2. Method

2.1 Device for detecting electrons and measuring the interference pattern

2.2 slit

2.3 Source of e-beam

流程(實例)

(sub-section titles及每個paragraphs的第一個sentence)

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2.2 slit

2.3 Source of e-beam

We generated free thermal electrons by heating a tungsten wire to 1000 K.
Bla bla…
Bla bla…

We accelerate the thermal electrons using a parallel plate, with a electric potential of 1000V between these two plates.
Bla Bla…
Bla bla…….

We selected electrons with velocities in the range of X-X m/s using XX magnetic field…..
Bla Bla….

流程(實例)

(sub-section titles及每個paragraphs的第一個sentence)

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We generated free thermal electrons by heating a tungsten wire to 1000 K.
Bla bla…
Bla bla…

We accelerate the thermal electrons using a parallel plate, with an electric potential of 1000V between these two plates. The plates have XX shapes and are separated by X meter…. The electric potential is maintained using an external power generator of bla bla bla. Bla bla bla….

We selected electrons with velocities in the range of X-X m/s using XX magnetic field…..
Bla Bla….

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2. 如何generate具特定動量的電子束

Results

1. 是否有對應到特定波長的干涉條紋？
2. 電子束動量熱誤差及系統性偏差?

Discussion

呼應問題

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2. 測量結果對應到什麼物理圖像
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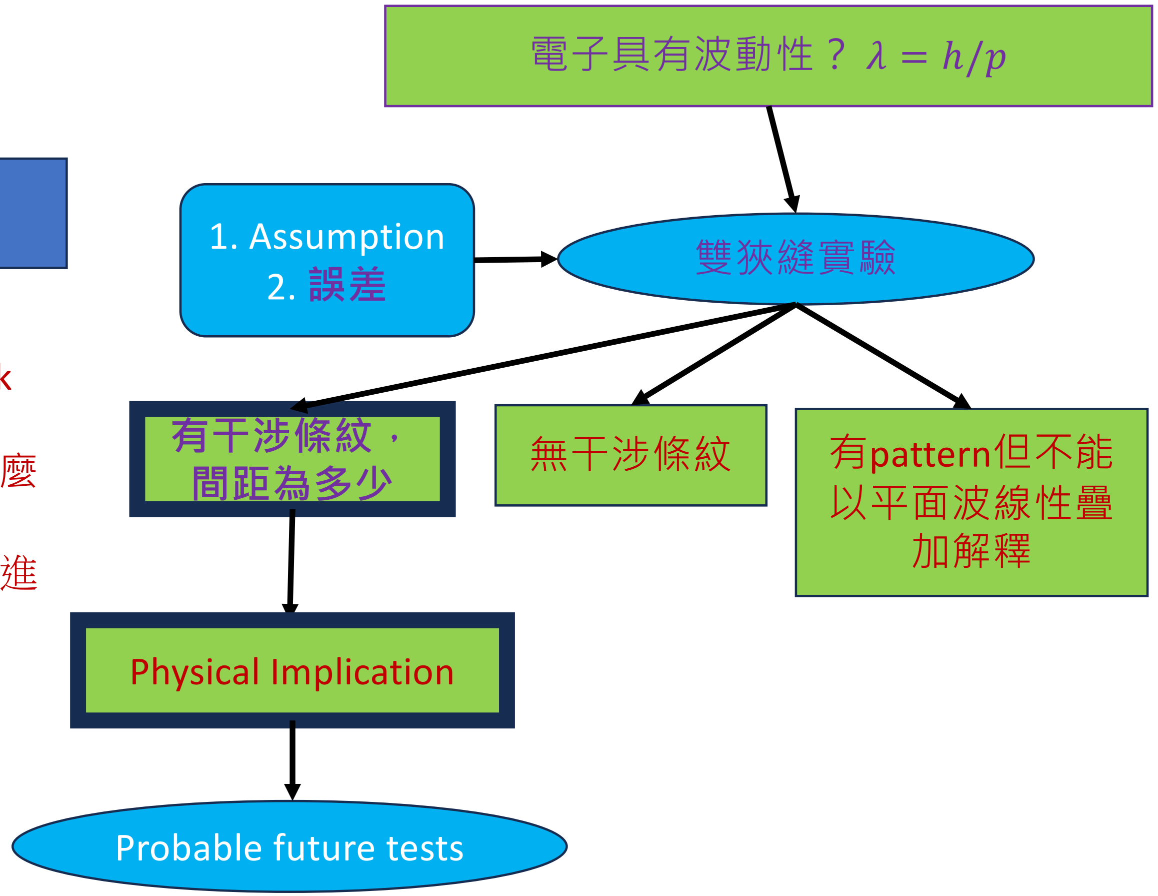

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Discussion

呼應問題

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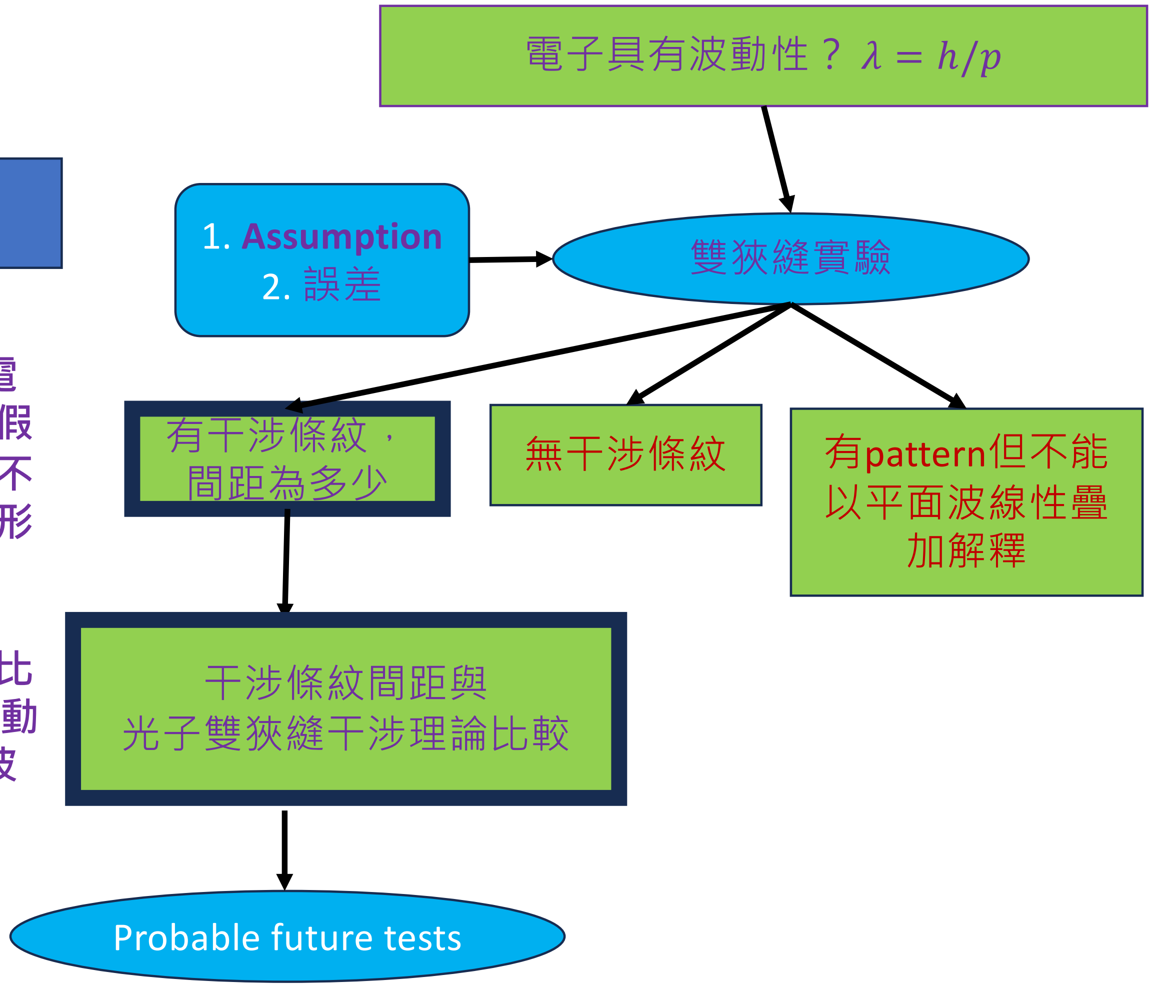

流程(實例)

Introduction

1. 電子具有波動性？$\lambda = h/p$

2. 雙狹縫實驗

Method

1. 用什麼device作為屏幕
2. 如何generate具特定動量的電子束

Results

1. 是否有對應到特定波長的干涉條紋？
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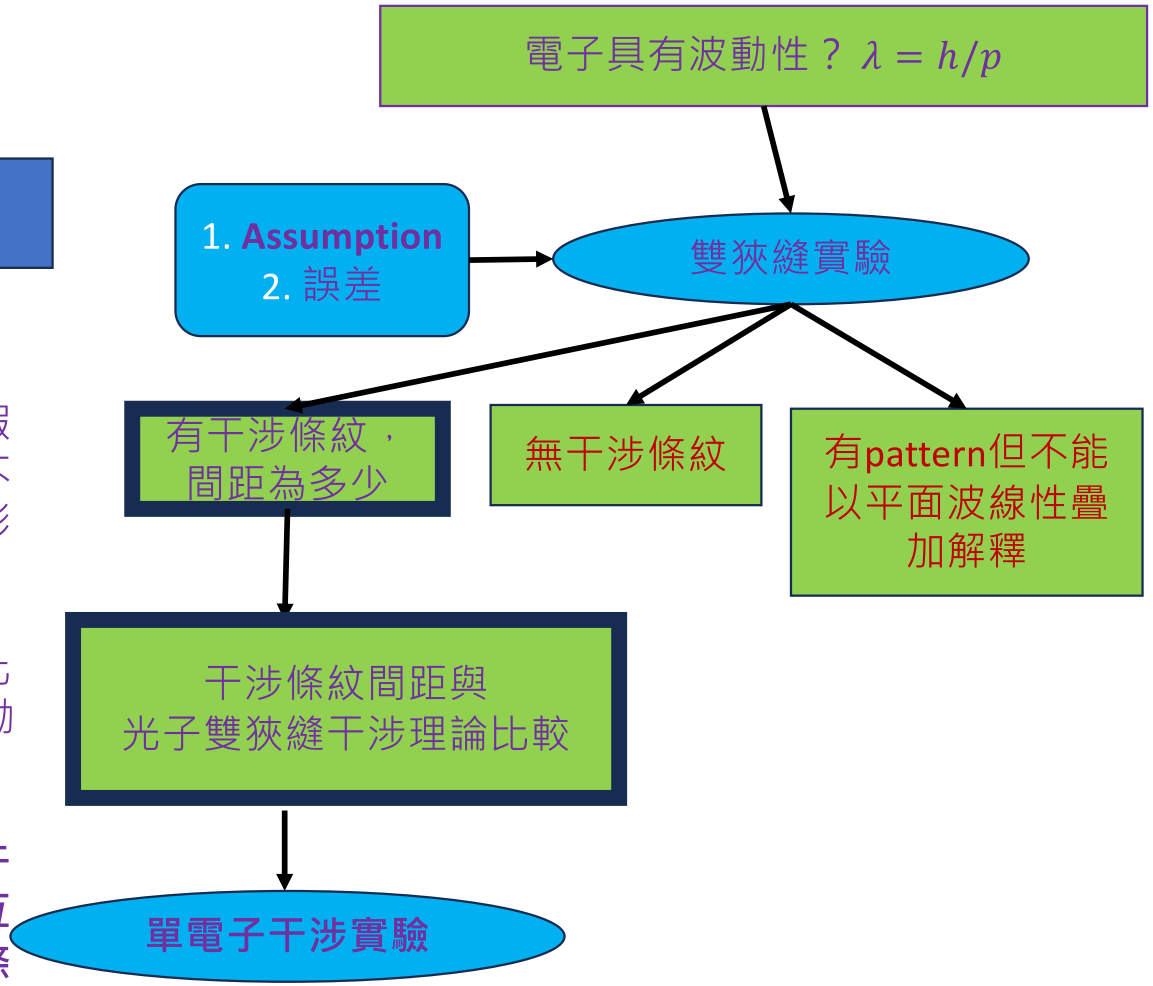

思考的嚴謹度(實例)

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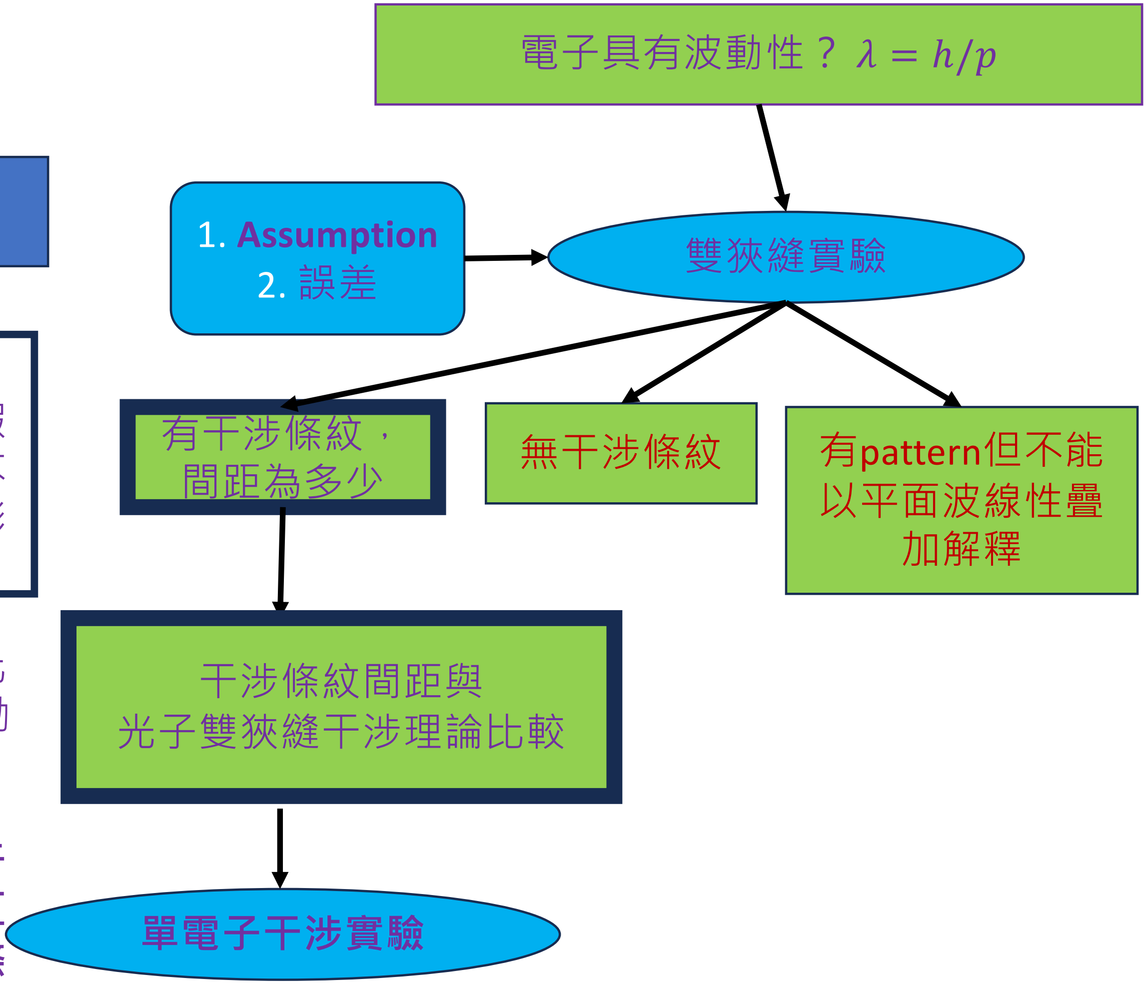

context(實例)

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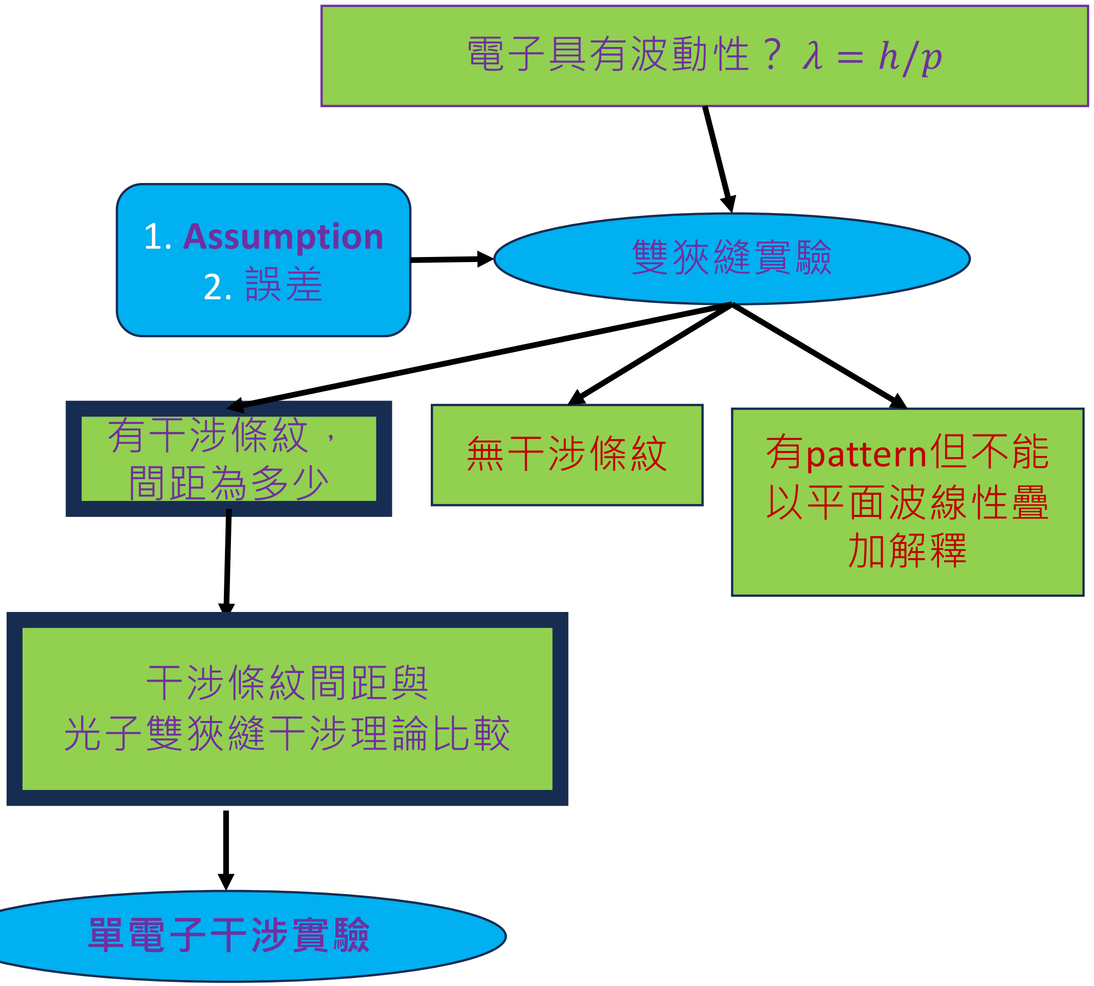

展望$$$$$(實例)

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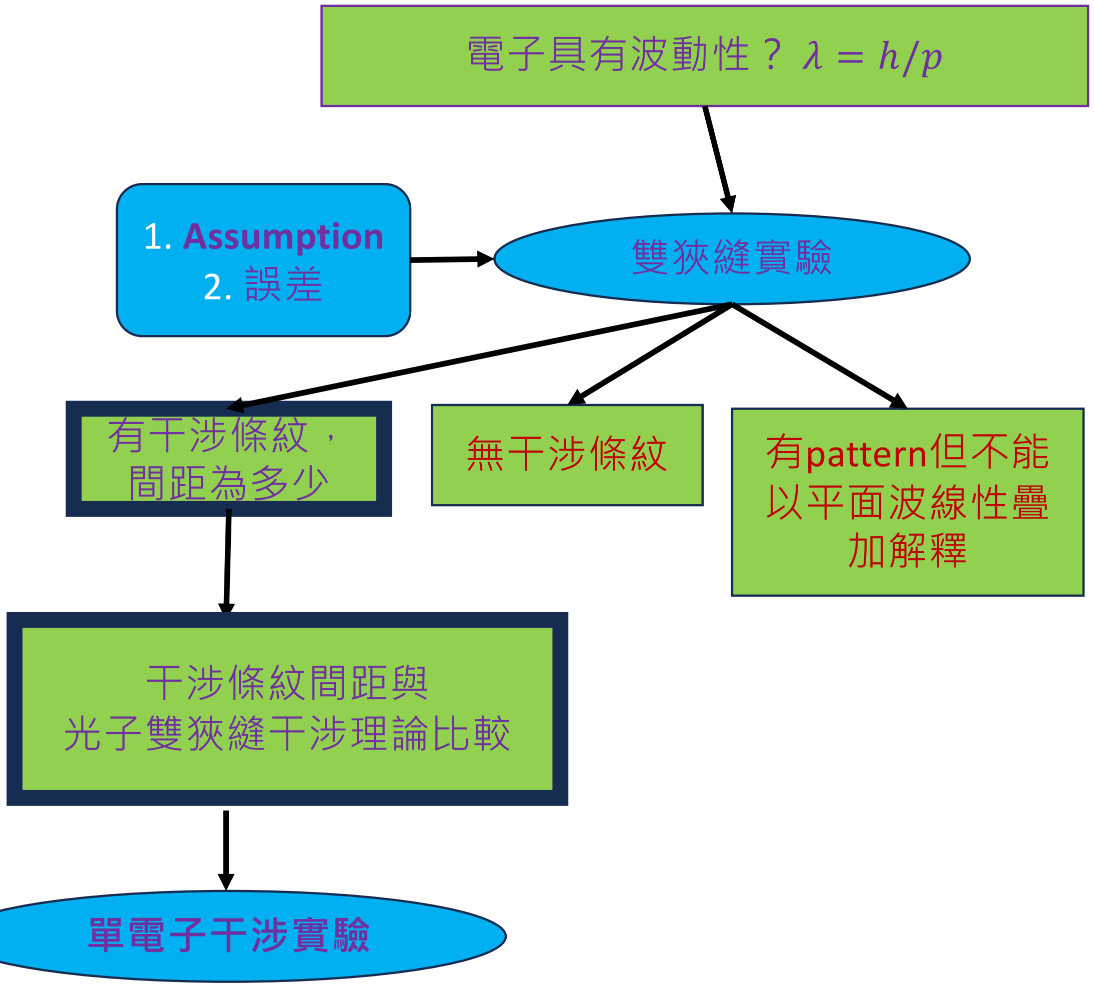

(實例)

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4. Discussion

2.1 Comparing with the interference patterns expected from a photon theory

2.2 Assumption of non-interacting electrons

2.3 Future work

(實例)

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4. Discussion

2.1 Comparing with the interference patterns expected from a photon theory

We evaluated the interference patterns of photons of the same wavelengths using Equations bla bla bla.

We found (1) consistency in which way, and (2) the inconsistency in which way.

The inconsistency may be attributed to issues A, B, and C.

Therefore, we do (or do not think) the theory of XXX can be verified (or falsified) by the present experiment.

2.2 Assumption of non-interacting electrons

2.3 Future work