PHYS 3313 – Section 001
Lecture #15

Monday, March 18, 2019
Dr. Jaehoon Yu

- X-ray scattering

- Bragg's Law

- de Broglie Waves

- Bohr's Quantization Conditions

Announcements

- Mid-term grade discussions in my office CPB342
  - Today: Class for the first 45min, from 1:50 – 2:30: Last name starts A – C
  - Wednesday, March 20: 12:30 – 1:00: Last name starts D – K; 1 – 1:30: L – P: 1:30 – 2:00: P - Z
  - Extremely important for you to come and talk to me about the prospect of your grade
- Mid-term exam results
  - Class average: 50.4/105
    - Equivalent to 48/100
  - Top score: 84

Evaluation Policy

- Homework: 30%
- Exams
  - Mid-term Exam (Wed., Mar. 6): 20%
  - Final Comprehensive Exam (11 – 1:30pm, Fri, May. 10): 25%
  - Missing an exam is not permissible unless pre-approved
    - No makeup test
    - You will get an F if you miss any of the exams without a prior approval
- Group Research Project: 15%
- Pop-quizzes: 10%

100%

- Extra credits: 10% of the total
- Grading will be done on a sliding scale
- 55% of the grade is in your hand!!

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- Volunteers needed for two physics workshop at UTA
  - 4/12 and 13: New Opportunities at the Next Generation Neutrino Experiments
    - A few students to help registration on 4/12 and 2 throughout the day to help the session
  - 4/18 and 19: US DUNE Near Detector Workshop
    - Two students in the morning of 4/18 for help with registration
    - Several students to help 4 breakout sessions – 2 each, total 8 for both days

Special Project #5

- Prove that the wave function $\Psi = A[\sin(kx-\omega t) + i\cos(kx-\omega t)]$ is a good solution for the time-dependent Schrödinger wave equation. Do NOT use the exponential expression of the wave function. (10 points)

- Determine whether or not the wave function $\Psi = Ae^{-\alpha|x|}$ satisfy the time-dependent Schrödinger wave equation. (10 points)

- Due for this special project is Wednesday, Apr. 5.

- You MUST have your own answers!

Research Projects

1. Each of the 9 research groups has an assigned research topic

Group Number	Research Topic	Reseasrch Group Members
1	Black-body Radiation	Z. Burns, N. Chapagain, A. Contreras, T. Doe, C. Nelson, B. Schuyler
2	Michelson-Morley Experiment	S. Boucher, J. Breen, R. Contreras, A. Richey, G. Sabine, B. Taylor
3	The Photo-Electric Effect	I. De Anda, M. Hanna, O. Jagtap, M. Kamerer, C. Morales, T. Nguyen
4	The Brownian Motion	I. Busch, M. Hail, T. Maxfield, J. Perez, D. Rademacher, P. Williams
5	Compton Effect	A. Adebayo, E. Alasadi, A. Chaid, T. Freeman, K. Karki, C. Newhouse
6	Discovery of Electron	C. Garces, E. Glazier, R. Guerra, C. Leferink, E. Ralston, J. Scantlin
7	Rutherford Scattering	M. Bui, A. Cole, J. Curtis, C. Kizer Pugh, A. Losh, I. Tucker
8	Super-Conductivity	M. Aquino, J. Bradford, S. Graf, S. Kapoor, M. Liu, M. Smith
9	The Discovery of Radioactivity	Y. Aryal, B. Garza, G. Hodges, C. Orr, S. Simmonds, R. Wood

Research Projects

1. Each of the 9 research groups has an assigned research topic
2. Study the topic as a group, looking up references
   - The original theory or the original observation
   - Experimental proofs or Theoretical prediction + subsequent experimental proofs
   - Importance and the impact of the theory/experiment
3. Each member of the group writes a 5 – 7 page report, including figures
   - 10% of the total grade
   - Can share the theme and facts but you must write your own!
   - Due beginning of the class Wed. Apr. 24, 2019
   - DO NOT Copy! Both the copies and the one allowed it will get F grade!
4. Each group presents a 10+2min power point talk
   - 5% of the total grade
   - Date and the order of presentations have been chosen today!

Reminder: Research Project Report

1. Must contain the following at the minimum
   - Original theory or Original observation
   - Experimental proofs or Theoretical prediction + subsequent experimental proofs
   - Importance and the impact of the theory/experiment
   - Conclusions and future prospects
   - The reference to **the original paper** must be included!
   - Bibliography referring to web site must be minimized (<20%)

Project Report Template

PHYS3313-Your-Name-Here

Title Goes Here Like This with The First Letter of Each Word Capital

PHYS-3313, Spring 2017
MM DD, 2017

Author Name
Department of XYZ
The University of Texas at Arlington

Abstract

Describe briefly and to the point the content of the note in about a paragraph or so, including the brief conclusion. The font of the main body must be Times New Roman 12pt. Tables and figures must be numbered in sequence as they appear as Table 1 or Figure 1. Each has its own numbering system. They must be placed as close to the text in which they are referred. They must have associated captions attached to them. These explain what the contents of the figure or table are. Captions must be Times New Roman 11pt. References must be placed to where the reference is relevant in a square bracket with a number counted in sequence as they appear but only in the main body not in the abstract.

1. Introduction

Describe what this paper is all about and how this note is organized [1] and motivate the readers.
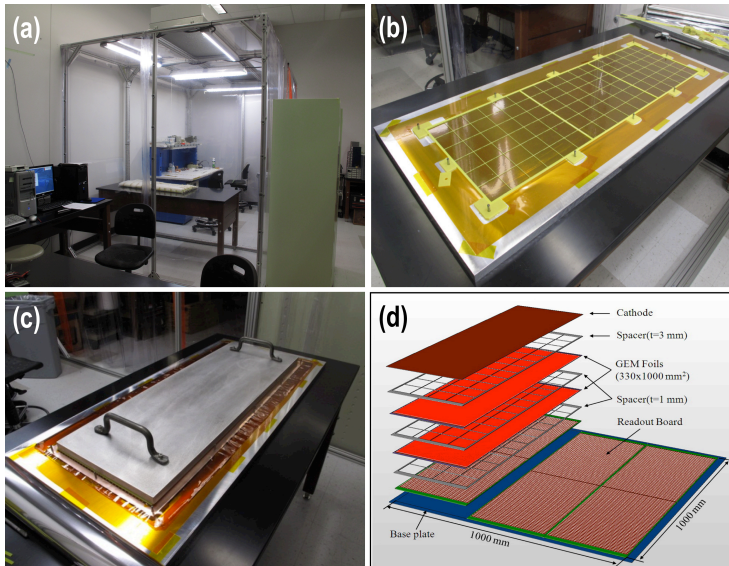

Figure. 1 (a) 12'x8' clean room for LGEM construction (b) An LGEM layer on an assembly jig held by alignment pins throughout the sides (c) glue curing process with heavy flattening pressing plane (d) Layout of a full $100\text{cm} \times 100\text{cm}$ GEM DHCAL active layer.

2. Original Theory or Experiment
Describe the original theory or experiment that prompted this particular paper here.

3. Theoretical predictions and/or experimental proofs
Describe the subsequent experimental proof of the theory or of the paper.

4. Importance and the impact of the theory/experiment of the paper
Describe in detail the importance and impact of the paper. What did we do with the knowledge of the paper?

5. Conclusions and Future Work
Describe what your conclusions are on this paper and what can be done more.

Bibliography← your references go here and in the text with the same reference numbers in order as they appear in the paper. They get assigned the ref. number just once. You then use them throughout the paper.
1. D. Decamp et al., ALEPH Collaboration, Nucl. Inst. Meth. **A360**, 481 (1995).
2. R. Bouclier, e*t al.*, "The Gas Electron Multiplier (GEM)," IEEE Trans. Nucl. Sci. **NS-44**, 646[1] (1997).

Research Presentations

- Each of the 9 research groups makes a 10+2min presentation
    - 10min presentation + 2min Q&A
    - All presentations must be in power point
    - I must receive all final presentation files by 8pm, Sunday, Apr. 21, 2019
        - No changes are allowed afterward
    - The representative of the group makes the presentation followed by all group members' participation in the Q&A session
- Date and time:
    - In class Monday and Wednesday, Apr. 22 and 24, 2019
- Important metrics
    - Contents of the presentation: 55%
        - Inclusion of all important points as mentioned in the report
        - The quality of the research and making the right points
    - Quality of the presentation itself: 15%
    - Presentation manner: 10%
    - Q&A handling: 10%
    - Staying in the allotted presentation time: 5%
    - Judging participation and sincerity: 5%

PHYS 3313-001, Spring 2019
Dr. Jaehoon Yu