

PHYS 1444 – Section 003

Lecture #22

Wednesday, Nov.
23, 2005

Dr. **Jaehoon Yu**

- Achievements of Maxwell's Equations
- Extension of Ampere's Law
- Gauss' Law of Magnetism
- Maxwell's Equations
- Production of Electromagnetic Waves



Announcements

- Quiz results
 - Average: 61.2
 - Previous averages: 71 and 54
 - Top score: 80
- Final term exam
 - Time: 11am – 12:30pm, Monday Dec. 5
 - Location: SH103
 - Covers: 29.3 – which ever chapter we finish next, Wednesday, Nov. 30
 - Please do not miss the exam
 - Two best of the three exams will be used for your grades



Maxwell's Equations

- The development of EM theory by Oersted, Ampere and others was not done in terms of EM fields
 - The idea of fields was introduced somewhat by Faraday
- Scottish physicist James C. Maxwell unified all the phenomena of electricity and magnetism in one theory with only four equations (Maxwell's Equations) using the concept of fields
 - This theory provided the prediction of EM waves
 - As important as Newton's law since it provides dynamics in electromagnetism
 - This theory is also in agreement with Einstein's special relativity
- The biggest achievement of 19th century electromagnetic theory is the prediction and experimental verification that the electromagnetic waves can travel through the empty space
 - What do you think this accomplishment did?
 - Open a new world of communication
 - It also yielded the prediction that the light is an EM wave
- Since all of Electromagnetism is contained in the four Maxwell's equations, this is considered as one of the greatest achievements of human intellect

