

Introduction to Astrophysics Research



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Objective:

A 2 Week Taste of Research

- Gamma-Ray Instruments
- UFFO - the Ultra Fast Flash Observatory
- Simulate X/gamma ray instruments; Predict their Performance
 - See Real Space Data
 - You could go on to do real research!
- Making Real Measurements
- Work a little bit in a lab
- Have fun

Objectives

- See labs and ways of doing things different than in your school
- **Reduce your fear of complex, ugly data**
- Learn Basic Data Analysis Skills (“playing” with columns of numbers; break down tasks in blocks)
- Learn about real instruments
- Learn about noise and background

EXPOSING YOU TO ASTROPHYSICS RESEARCH

- This is not like lecture class - by design - we want to expose you to something different - jump ahead to thinking about scientific research.
- Participation Demanded - please ask questions, ask about details; Do not sit passively - make something of this time
- You will *not* understand everything - that's OK - your "job" is to get excited and interested in any aspect of what we show you, then learn more by asking questions, looking things up later, or trying it yourself
- There are boring and frustrating parts of research (especially the computers parts). It's OK... do your best, try again later, ask for help.



HOW TO TAKE THIS COURSE

- This course was given at the Institute for the Early Universe (IEU) in Seoul, Korea During Summer of 2012.
- The course included guest lectures by postdocs doing cutting-edge research to give students a view from people recently students, and by Prof. Galkin of Moscow State University, and Prof. George Smoot of UC Berkeley, IEU, Paris Center for Cosmological Physics
- Our optics and high energy instrumentation labs were toured, and students did some lab work.
- For this course, instructors should try and arrange similar tours and guest lectures for their students. Web-only students should follow the URLs given for virtual tours and do the exercises as well as they can, and apply to similar internships as much as possible - it can be a great learning experience.

Schedule of original internship at IEU, Seoul

Week 1

	AM1	AM2	PM1	PM2
M	Welcome	Research & International Perspective	Logistics (net access) Guest Lecture 1	GRBs and UFFO, questions
Tu	Data Anal Project	Guest Lecture 2	UBAT	Seminar
W	Smoot & Related Research	From Emission to Detectors to Data	CMB Research (Smoot)	Data Anal Individual
Thu	UFFO/SMT	Data Anal	DatAnal	Data Anal Individual
Fri	Optical Measurements		Campus Tour (If possible)	

Schedule of original
internship at IEU, Seoul

Week 2

	AM1	AM2	PM1	PM2
M	BigBOSS	Guest Lecture IV	DatAnal	Local researcher
Tu	Optical Fibers		Optical Fibers Lab	Seminar
W	Guest Lecture V	Data Anal		Local researcher
Thu	Data Anal	Data Anal	DatAnal	
Fri	Data Anal			