

AS109: Instrumentation and Data analysis of balloon Borne Space Exploration (10 lectures in 15 hrs)

(A certificate course for UG, PG and PG+ students)

Instructors: R. Sikdar

Teaching assistants: S. Chakraborty, S. Biswas, K. Belwal, M. Bisht

Mode of Instruction: English

Syllabus

Introduction (1 Lecture)

Instructor: R. Sikdar

History of balloon missions; Basics of stratospheric balloons; 'Dignity' balloon missions of ICSP.

Instruments (1 Lecture)

Instructor: R. Sikdar

Onboard instruments; Instruments calibration and energy resolution.

Data analysis (3 Lectures)

Instructor: R. Sikdar

Onboard data analysis processes: Coding languages like C, C++, Python, etc., CERN ROOT (a data analysis framework); Background radiations and elimination processes.

Astronomical Events (1 Lecture)

Instructor: R. Sikdar

Astronomical X-ray and Gamma-ray events; Cosmic X-ray/gamma-ray strong sources.

Detection of sources (3 Lectures)

Instructor: R. Sikdar

Detection of sources using balloon data analysis; Solar flares; Gamma ray burst; The Sun in a quiet state; Cygnus X-1; Crab pulsar.

Conclusions (1 Lecture)

Instructor: R. Sikdar

Limitations; Conclusions of stratospheric balloon missions; Future plans.

Sitapur Observatory trip (1 night)

Instructors: Devendra Bisht, Kuldeep Belwal, Mohit Bisht, Shraddha Biswas, Soumojit Tiwari

Discussion on the observables in the night sky, software guided observation using optical telescopes; hands-on experience on telescope assembling.