Follow-up Observations at Gunma Astronomical Observatory

Hidenori Takahashi*, Osamu Hashimoto, Kenzo Kitagasa, Satoshi Honda, and Hikaru Taguchi

Gunma Astronomical Observatory (GAO), which is located about 120km northwest of Tokyo, is not operated only for public education of general people but also for astronomical observation. We have some advantages for scientific research; (1) multiple telescopes; 150cm reflector, 65cm telescope, 25-30cm size small telescopes, and customized telescope unit for gamma-ray burst object (GETS), (2) multiple instruments of 150cm reflector; optical high dispersion echelle spectrograph (GAOES), near infrared camera and spectrograph (GIRCS), and low resolution spectrograph and imager for optical wavelength (GLOWIS), and (3) having time flexibility of urgent or long term observations.

Making use of above advantages, we make various observations as follows in addition to nominal observation programs; for example, follow-up observations of transient objects, cooperation observation with satellites including campaign, cooperation with other institutions, educational use for students or young astronomers from overseas. The observation object extends to many topics such as GRBs, SNe, Novae, AGB, Variable, Comet, WR, Tago event, and etc..

Scientific Instruments at GAO

- **Gunma Astronomical Observatory Echelle Spectrograph (GAOES)**
  
  GAOES is a high resolution spectroscopy on a Nasmyth focus of the 150cm reflector. It provides an optical spectrum of a special resolution up to 100,000.

- **Gunma Infrared Camera and Spectrograph (GIRCS)**
  
  GIRCS is an infrared camera at Cerro Tololo for wavelength from 1.0-2.5 microns, covering a field of 9 square arcminutes. It has also spectroscopic capability using grism.

- **Gunma LOW resolution Spectrograph and Imager (GLOWIS)**
  
  There is low resolution spectrograph GLOWIS at a bent Cassegrain focus. It is useful for the identification of newly discovered targets such as SNe.

- **CCD camera and Gunma Compact Spectrograph (CCS)**
  
  Some CCD camera and spectrograph (CCS) are available on 65cm reflector for various observations.

Various Observations at GAO

- **List of IAU Circulars / CBET**
  
  - CBET 9189
  - SN 2006x
  - SN 2009ds in NGC3905
  - SN 2001bg in NGC2608
  - SN2006bb in UGC4468

- **List of GCN (The Gamma-ray Burst Coordinate Network)**
  
  - GRB060427
  - GRB080307
  - GRB090408

- **Cooperation with Satellite and follow-up observation for Satellite**
  
  - Super Novae
  - Nova
  - Variable
  - Others