Aiding Basic Space Science in Developing Nations

The Official Development Assistance (ODA) programme of Japan

Kaz Sekiguchi
National Astronomical Observatory of Japan

Scientific and Technical Subcommittee
47th session, COPUOS
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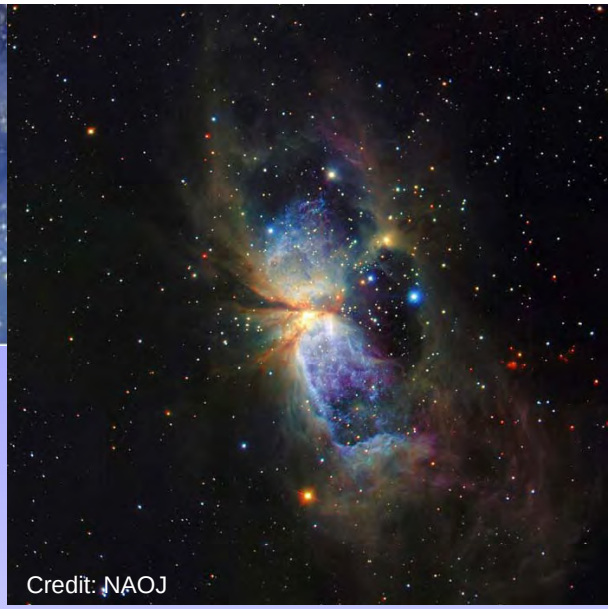
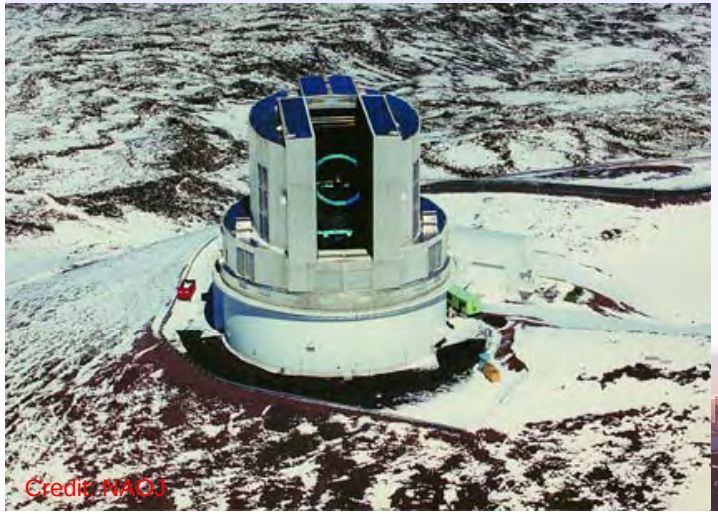


1) Why astronomy?

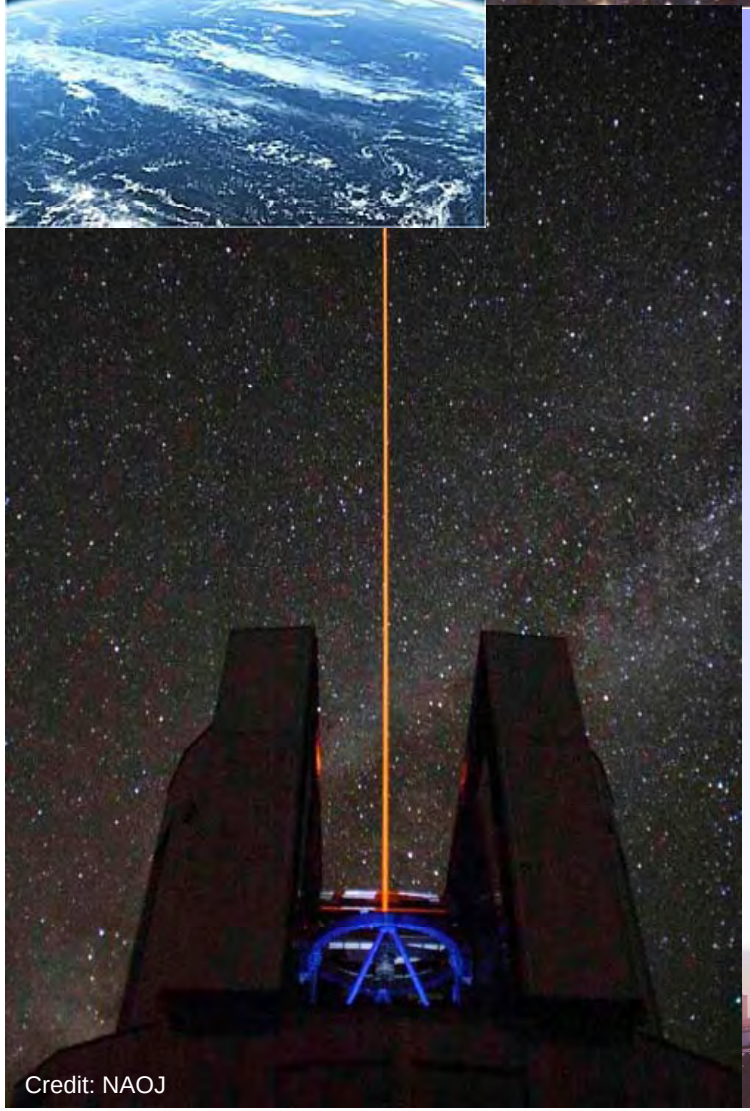
2) TRIPOD concept

3) Japan's Official Development Assistance (ODA)

4) Over 25 years of commitments



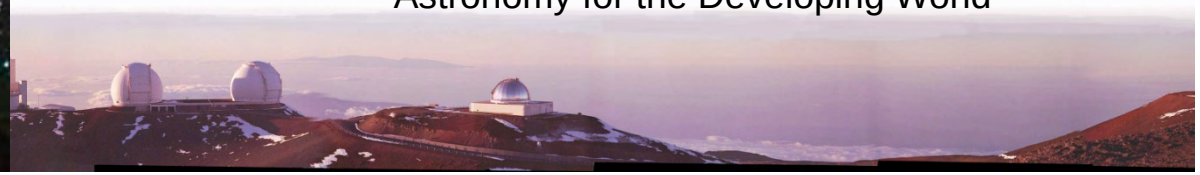
1) Why astronomy?



Astronomy provides an inspirational and unique gateway to technology, science and culture, three fundamental characteristics of developed nations.

By mobilizing large numbers of talented and creative scientists, engineers and teachers in the service of international development, the plan will be a cost effective spinoff of one of the most profound adventures of our civilization - *the exploration of the Universe*.

From IAU Strategic Plan 2010-2020
- Astronomy for the Developing World -

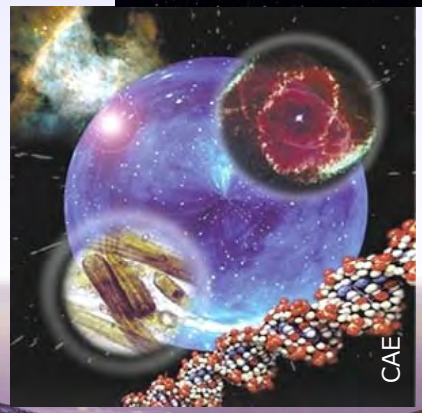


1) Why astronomy?

Astronomy combines science and technology with inspiration and excitement, it can play a unique role in facilitating *education* and *capacity building* and in furthering *sustainable development* throughout the world.

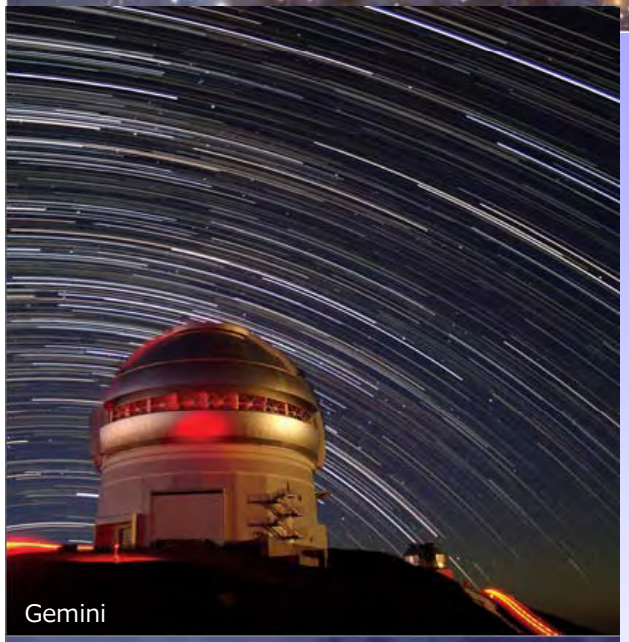
- It's an exciting gateway into
  physics, *chemistry*, *biology* and *mathematics*.

- The need to study the faintest celestial objects has
  driven advanced developments in
  electronics, *optics* and *information technology*.



- It inspires teenagers to choose a career in
  science and *technology*

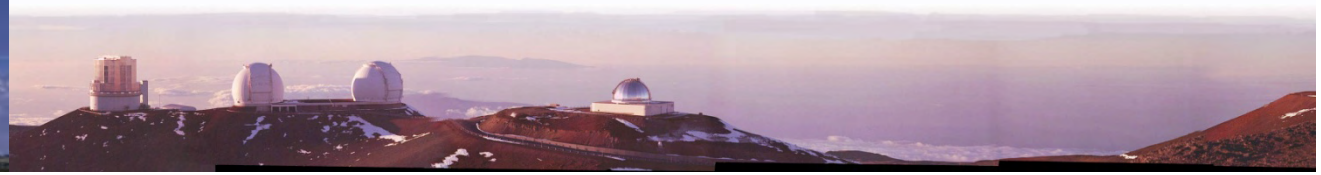
1) Why astronomy?


Gemini


NRAO

There is an enormous potential for using astronomy as a tool for stimulating international development.
It is one of the purposes of COPUOS:

Promotion of international cooperation in the peaceful uses of outer space for economic, social and scientific development, in particular for the benefit of developing nations.



2) TRIPOD concept

The UN Office for Outer Space Affairs,

Basic Space Science Initiative

Telescope Facility
(Infrastructure)
ODA of Japan

Observing Programme
(Research)
IAU, NAOJ, etc.

Teaching Programme
(Education)
IAU

2) TRIPOD concept

Astronomical telescope facilities were supplied by the Official Development Assistance (ODA) of Japan.

NATIONAL UNIVERSITY OF ASUNCION
REPUBLIC OF PARAGUAY

45-cm telescope

2) TRIPOD concept

Research programmes were coordinated and supported by the National Astronomical Observatory of Japan and the IAU.

Sri Lanka astronomer adjusting CCD spectrograph for the reflector.

Spectroscopic Observations of Novae V1065 CENTAURI and V1280 SCORPII using 45cm Cassegrain Telescope at Arthur C Clarke Institute, Sri Lanka

J. Adassuriya, S. Gunasekera, and I. Medagangoda
Arthur C Clarke Inst. for Modern Tech., Sri Lanka

The spectroscopic observations of two novae namely nova Centauri 2007 (V1065 CEN) and nova Scorpii 2007 (V1280 SCO) were made by 45 cm Cassegrain telescope with f/12 at Arthur C Clarke Institute, Sri Lanka during the period at 31st January to 20th Feb 2007. High resolution ($\lambda/\Delta\lambda$=22000) profiles in Hα (6563 oA) region were obtain for V1065 CEN, 6, 15 and 20 days after maximum and Hα profiles of the same resolution were obtained for V1280 SCO, 4 days after maximum, covering the early decline stages of novae.

V1065 CEN is He/N-type spectra which characterize a broad (Gaussian FWHM 49 oA), saddle shaped and asymmetric Hα emission line with out prominent P-Cyg absorption component. Completely different Hα profile of V1280 SCO shows prominent P-Cyg absorption and narrow emission line (Gaussian FWHM 26 oA) which can be classified as Fe II type nova. The absence of prominent P-Cyg structure in V1065 CEN suggests that the emission causes by discrete shell while the prominent P-Cyg structure in V1280 SCO evidences a wind-like structure. The expansion velocities of these two systems measured from the minima of the P-Cyg profiles are close to 2300 km/s for V1065 CEN, 6 days after the maximum and 716 km/s for V1280 SCO, 4 days after the maximum.

The light curves V-t, B-t and visual-t have been used to estimate the distances of both novae. Based on the photometric analysis, the Nova V1065 CEN can be classified as fast ($11<t2<25$) nova with the parameters t2V 21 days, t3V=28 days and t2B 23 days, t3B=31 days. The derived absolute magnitudes at maximum for nova V1065 CEN to be Mo,V = -7.58±0.18 and Mo,B= -7.75± 0.25. The mean distance module 16.57 and the color excess EB-V = +0.6 correspond to a distance 8.51±0.33 kpc. The parameters t2V=12 days and t3V=14 days were calculated from visual-t light curve for nova V1280 SCO and It can be determine that the nova is in between very fast and fast nova. The rate of decline at t2, 0.48 mag/d (very fast>0.2 mag/d) clearly determine that V1280 SCO is classified as very fast nova. The mean absolute magnitude at maximum is calculated to be Mo,V=-8.7±0.1. Neglecting the interstellar reddening the estimated distance to the nova V1280 SCO is 3.2±0.2 kpc.

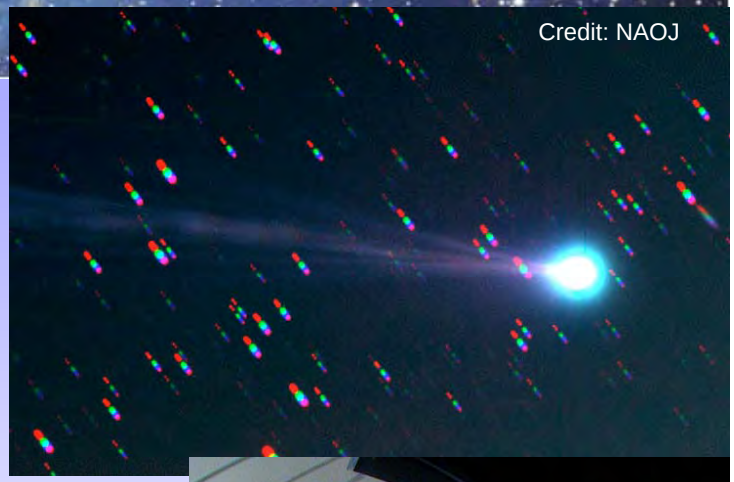
A research paper presented at the 2009 UN/NASA/ESA/JAXA Workshop on BSS & IHY 2007 in Daejeon, Korea, (Sept. 21-25, 2009)

2) TRIPOD concept

Teaching material and hands-on astrophysics material has been developed for the operation of such astronomical telescope facilities in an university environment.

IAU Summer School 2008, National Univ. of Mongolia

2) TRIPOD concept



This approach to:

- astronomical telescope facility,
- research programme, and
- teaching astronomy

has become known as

the basic space science

TRIPOD concept.

2) TRIPOD concept

A similar TRIPOD concept is being developed for the planetarium facilities.


Credit: GOTO


Credit: GOTO

-Planetarium facility

Supplied by the ODA of Japan

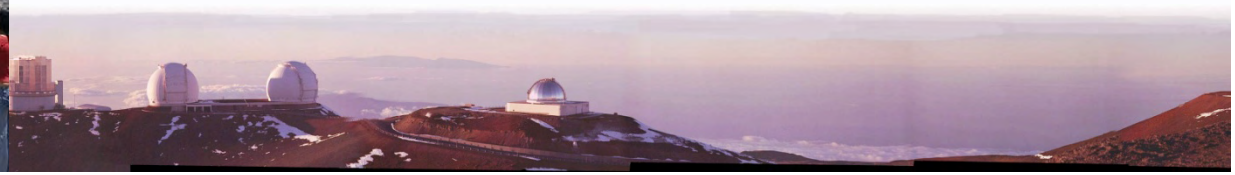
-Operation support

Follow up assistance programmes by
Japan International Cooperation Agency (JICA)

and

-Planetarium contents (software and programs)

With help from International Planetarium Society.



3) Official Development Assistance (ODA) programme

Official Development Assistance (ODA) programme

(http://www.mofa.go.jp/policy/oda/)

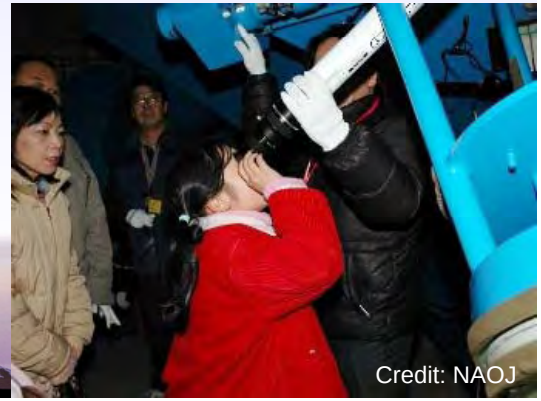
Started in 1954

Objectives:

- Contribute to the peace and development of the international community
- Help ensure Japan's own security and prosperity.

Major parts of the ODA support goes to:

- economic and social infrastructure development,
- human resource development,
- institution building.



Credit: NAOJ

3) Official Development Assistance (ODA) programme

In 1975, Cultural Grant Aassistance (CGA) programme
(http://www.mofa.go.jp/policy/oda/category/cultural/index.html)
was introduced.


Credit: NAOJ


Credit: NAOJ

The Cultural Grant Assistance (CGA) provides to contribute to the promotion of cultural and higher educational activities and preservation of cultural heritage in developing countries.

The CGA funds the projects for the provision of equipment the construction or rehabilitation of facilities of the national government agencies in developing countries.

4) Over 25 years of commitments by Japanese Government

Since 1982, the Japanese Government has donated
27 units of astronomical equipment to 22 nations.

National Astronomical Observatory of Tarija , Bolivia

7 of the items donated were professional-grade reflecting telescopes with scientific instruments, such as CCD cameras and/or the spectrographs, which can be used for photometric and spectroscopic observations.

In addition to these, 20 planetarium systems have been installed at universities and space-education museums.

4) Over 25 years of commitments by Japanese Government

7 Telescopes

Table 1: Astronomical equipment (reflective telescopes and accessories) donated by Japan

Receiving Institutions	Country	Year	Tel. size(ϕ)
- Science Centre	Singapore	1987	40cm
- Bosscha Observatory, Bandung Institute of Technology	Indonesia	1988	45cm
- Chulalongkorn University, Bangkok	Thailand	1989	45cm
-Arthur C. Clarke Institute for Modern Technologies	Sri Lanka	1995	45cm
- Asuncion National University	Paraguay	1999	45cm
-Philippine Atmospheric, Geophysical and Astronomical Services Administration	The Philippines	2000	45cm
-Cerro Calan Astronomical Observatory, Univ. of Chile	Chile	2001	45cm

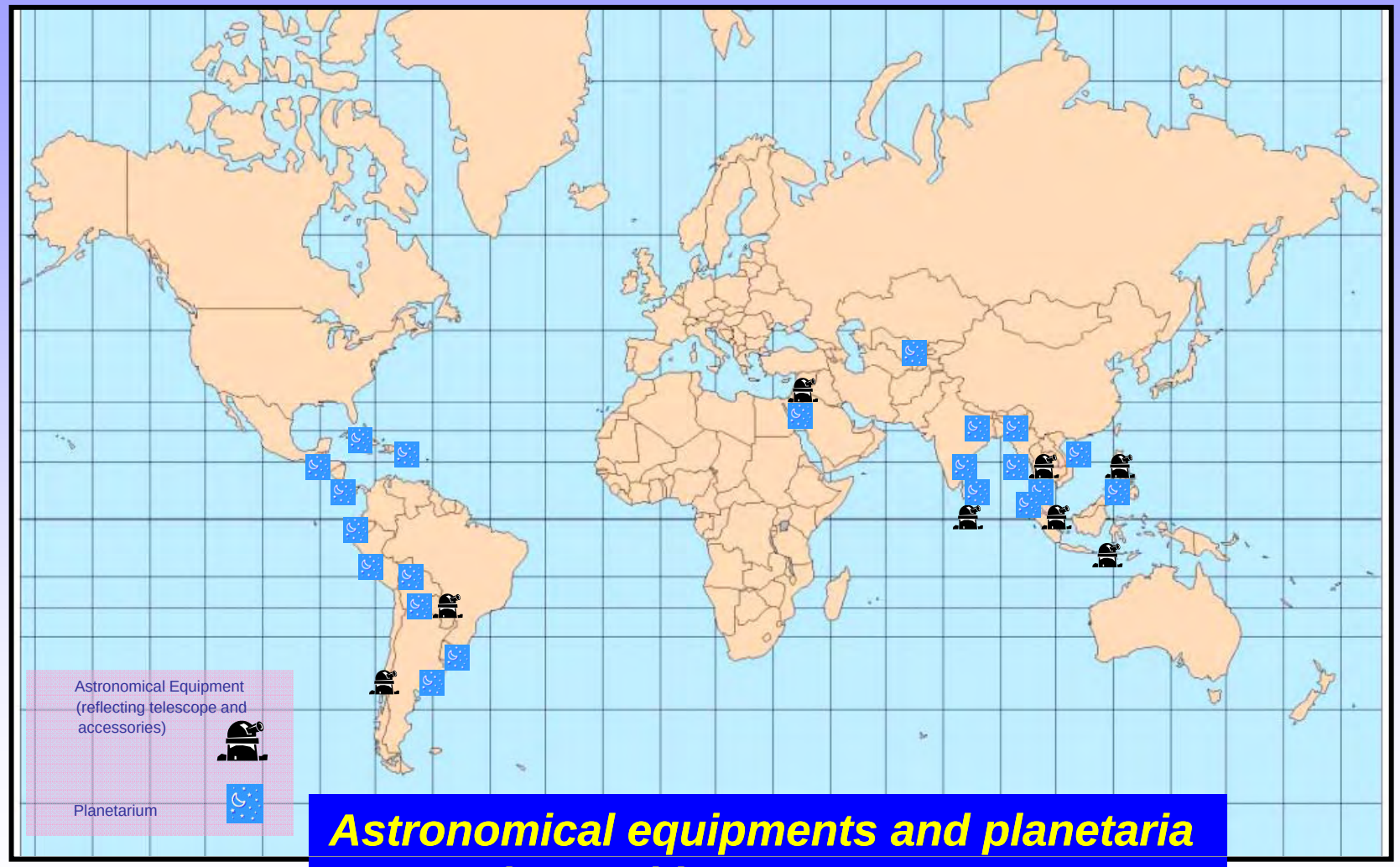
4) Over 25 years of commitments by Japanese Government

20 Planetarium equipment

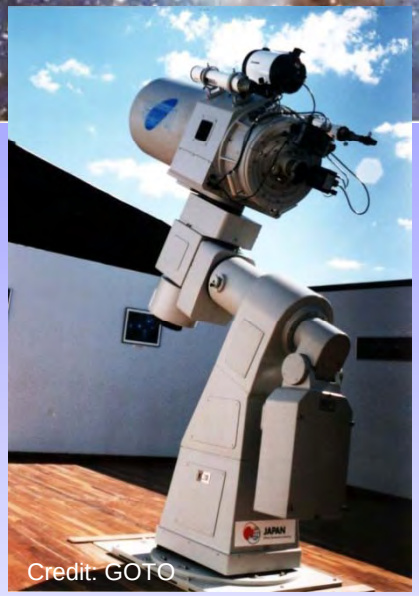
Table 2: Planetarium equipment donated by Japan

Planetarium/location	Country	Year
Pagoda Cultural Centre, Ynagon	Myanmar	1986
Haya Cultural Centre, Amman	Jordan	1989
Space Science Education Centre, Kuala Lumpur	Malaysia	1989
Auxiliary projectors for the already existing planetarium, Manila	The Philippines	1990
Meghnand Saha Planetarium, University of Burdwan Golapbag	India	1993
Planetario de la Ciudad, Buenos Aires	Argentina	1993
Planetario de la Ciudad, Montevideo	Uruguay	1994
Ho-Chi Minh Memorial Culture Hall, Vinh City Planetarium	Viet Nam	1998
Auxiliary projectors for the already-exsisting planetarium, Bangkok	Thailand	1998
Auxiliary projectors for the already-exsisting planetarium, Colombo	Sri Lanka	1998
Anna Science Centre Planetarium, Tamilnadu Science and Technology Centre	India	1999
City Park, Tashkent	Uzbekistan	2000
Asuncion National University	Paraguay	2001
Planetario Municipal, Cuenca	Ecuador	2002
Children Museum, San Pedro Sula	Honduras	2002
National Costa Rica University	Costa Rica	2003
Laboratorio Central del Instituto Geofisico, Lima	Peru	2004
National Astronomical Observatory of Tarija	Bolivia	2007
Tin Marin Children's Museum, San Salvador	El Salvador	2007
National History Museum, Habana	Cuba	2009

4) Over 25 years of commitments by Japanese Government



Astronomical equipments and planetaria donated by Japanese ODA



Credit: GOTO

Bosscha Observatory, Indonesia


Credit: Bosscha Obs.

Photometric and Spectroscopic Studies of BW Eri

Desima Kristyowati, Hakim L. Malasan, and Hanindyo Kuncarayakti

Abstract New CCD photometric and spectroscopic studies of eclipsing binary BW Eridani are presented. BVRI photometric observations were carried out using Bosscha's 20-cm (f/10) GAO-ITB Remote Telescope System in 2006 and 28-cm (f/10) Schmidt–Cassegrain telescope in 2007. Low-resolution spectra ($R = 400 \sim 500$) were obtained using Bosscha's 45-cm (f/12) GOTO telescope equipped with Bosscha Compact Spectrograph (Malasan et al. 2001) in optical window. The investigation of B, V, R, I light curves by fitting method yields in temperature 7,480 ± 2,950 K and 5,200 ± 875 K, fractional radii 0.491 ± 0.126 and 0.280 ± 0.135, for the primary and secondary components, respectively. An inclination 89° ± 2.2° is also deduced. We obtained the time for primary eclipse at HJD = 2453769.1760 ± 0.0118 by Kwee–van Woerden method, which indicate period change. At the orbital phase of 0.955 and 0.511 the star's spectrum is consistent with spectral type G8V for the secondary and A7V for the primary, respectively.

Keywords Eclipsing binary · Photometry · Spectroscopy

1 Introduction

The eclipsing binary system BW Eri (SAO 169130; period 0.6384777 days) has been known as a candidate for a system caught in an out-of-contact state. The previous observations by Baade in 1976 and Duerbeck in 1977 were carried out with *UBV* photometers in European Southern Observatory, gave the evidence of period variation. The complete photometric study was first announced by Baade et al. (1982), who leads some conclusion i.e. BW Eri is a semi-detached system, with the primary filling its critical volume, component with very different surface temperatures, and a period variation that seems to indicate a mass transfer.

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e-mail: mydesima@gmail.com

H.J. Haubold and A.M. Mathai (eds.), *Proceedings of the Third UN/ESA/NASA Workshop on the International Heliophysical Year 2007 and Basic Space Science*, Astrophysics and Space Science Proceedings, DOI 10.1007/978-3-642-03325-4_13,

A research paper published in Proceedings of the Third UN/NASA/ESA/NASA Workshop on BSS & IHY 2007, ASSP, p149 (2010)


Credit: GOTO

NATIONAL UNIVERSITY OF ASUNCION REPUBLIC OF PARAGUAY


Credit: GOTO

Example of CCD photometry using the 45-cm telescope in Paraguay

Fredy Doncel, Arexis Toroche and Takeshi Noguchi
Universidad Nacional de Asuncion Facultad Politecnica Observatorio Astronomico

Abstract

A SX Phe-type pulsating variable KZ Hya (HD94033) was observed with CCD set attached to the 45-cm reflector at Asuncion Astronomical Observatory in Paraguay. In the present work, 7 maximum phases were covered. A new ephemeris has been obtained, and the result suggests a probable change of the pulsation period of KZ Hya.

1. Introduction

CCD photometric observations of KZ Hya ($\alpha=10^h51^m54.1^s$, $\delta=-25^d21^m11^s$, 2000) were made during 4 nights from April 18 to May 9, 2002, with the 45-cm reflector (made by Goto) at Asuncion Astronomical Observatory (Longitude=57.^{d}4012W, Latitude=-25.^{d}08, h=25m) in Paraguay. A photograph of the 45-cm telescope is shown in figure 1, and the observatory building with sliding roof is shown in figure 2.

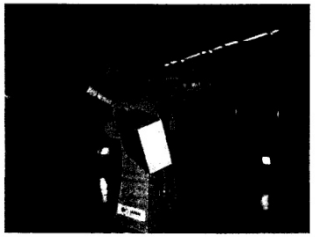


Figure 1. The 45-cm telescope at Asuncion Observatory.


Figure 2. The Observatory building with a sliding roof.

2. Observation and reduction

Observations of KZ Hya were carried out using CCD camera with *BVRI* color filters, attached to the Cassegrain focus the 45-cm telescope. The present ST-8 type CCD camera has 1530*1020 pixels with field of view of about 8.7*5.8 arc-minutes, which system was made by SBIG (Santa Barbara Instrument Group).

Figure 3 shows the result of CCD photometry during the night of May 8, 2002 as an example. Exposure times of the used color-bands *BGRI* were 30 second (*B*-band), 10 second (*G*-band), 10 second (*R*-band),

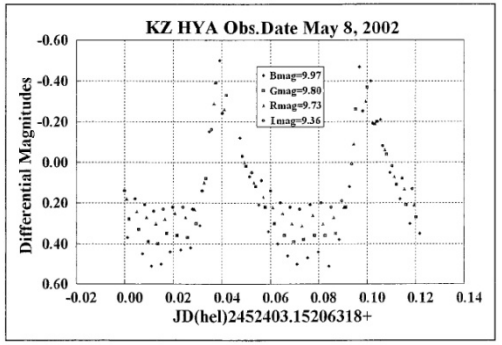


Figure 3. The observation of CCD photometry of the KZ Hya with *BGRI* colors which were made during the night of May 8, 2002

A research paper presented at the 2009 UN/ESA/NASA Workshop on BSS & IHY 2007 in Tokyo, Japan, (June 18-22, 2007)

Credit: GOTO

PHILIPPINE ATMOSPHERIC GEOPHYSICAL AND ASTRONOMICAL SERVICE ADMINISTRATION

UNIVERSIDAD DE CHILE


Credit: GOTO


Credit: GOTO

Científico Mutsumi Ishitsuka y dirigente Luis Sakoda fueron condecorados por gobierno japonés

El embajador del Japón, Shuichiro Megata, reconoció ayer la destacada labor científica del estudioso japonés Mutsumi Ishitsuka, así como del dirigente nikkei Luis Sakoda, a quienes distinguió con las condecoraciones de Primavera.

El Gobierno japonés otorgó al Dr. Ishitsuka la condecoración en la orden Tanguioku Shiojushu y en tanto que a Sakoda le correspondió la condecoración en la orden Kiokujitsu Sookoo Shio.

En la ceremonia estuvieron presentes, la esposa, hijos, familiares y amigos de los condecorados, además, representantes del Consejo Directivo de la Asociación Peruano Japonesa, que preside Carlos Saito y el presidente de la Asociación Estadio La Unión, Julio Gushiken.

El embajador del Japón, Shuichiro Megata, hace entrega de la condecoración en la orden de los Tesoros Sagrados con Rayos de Oro y Escarapela.

MUTSUMI ISHITSUKA

El embajador Shuichiro Megata se refirió al valioso aporte de su compatriota Mutsumi Ishitsuka en el estudio de la astronomía en el Perú.

Ishitsuka, experto en geofísica e investigador Científico Emérito del Instituto Geofísico del Perú, llegó a nuestro país en la década del setenta y desde entonces dedicó su vida a la investigación en el Observatorio Solar Cosmos, en Huancayo, que se convirtió en referencia mundial, porque allí estaba instalado uno de los más modernos coronógrafos.

En 1992 fue nombrado Director del Observatorio del Centro de Investigación Geofísica de Ancón.

Mutsumi Ishitsuka ha recibido múltiples distinciones, entre ellas, el título Doctor Honoris Causa de la Universidad Nacional de Ingeniería y recientemente, fue inaugurado en Ate el planetario solar, que en homenaje al científico japonés lleva su nombre.

En la ceremonia, Mutsumi Ishitsuka estuvo acompañado por su esposa Ayako Ishitsuka.

LUIS SAKODA

Luis Sakoda Shinyashiki es descendiente de la prefectura de Kagoshima. Ha desempeñado los máximos cargos en importantes instituciones nikkei, como la presidencia de la Asociación Estadio La Unión, en 1970 y de la Asociación Panamericana Nikkei filial Perú, en 1980.

En 1995 ejerció la presidencia de la Asociación Peruano Japonesa. También formó parte de la Comisión de Festejos del 90 aniversario de la Inmigración Japonesa al Perú, de la Comisión de Construcción de la Clínica Centenario, la Asociación Emmanuel y Perú Kagoshima Kenjinkai.

Luis Sakoda acudió al acto de condecoración acompañado de su esposa, Juana Sakoda.

El brindis de honor estuvo a cargo del congresista Rafael Yamashiro, quien conoce de cerca la trayectoria de Mutsumi Ishitsuka y Luis Sakoda.

Desde Japón llegarán dos telescopios para Región Ica

El Dr. Mutsumi Ishitsuka anunció la llegada desde Japón de dos telescopios que serán destinados a la Región Ica.

"Uno de ellos está conformado por un conjunto de seis telescopios solares que se encuentran operando en el Observatorio Hida, Universidad de Kyoto, los cuales serán instalados en el mes de setiembre en la Estación Solar de la Universidad Nacional San Luis Gonzaga de Ica. Por ello se ha planificado el entrenamiento de dos jóvenes estudiantes en el manejo de este telescopio en el Observatorio de Hida", explicó Ishitsuka, en su mensaje de agradecimiento a la condecoración que le hizo llegar el Gobierno japonés.

Asimismo precisó que el segundo telescopio será instalado en el Observatorio Astronómico Educativo, en la zona denominada cerro Jahuay, cercana a la ciudad de Ica. "Este telescopio será una donación por parte del Dr. Takehiko Kuroda, del Observatorio Astronómico de Nishi-Harima, de Hyogo, quien realizando una colecta logró recaudar los fondos necesarios para la construcción de este telescopio, al que sólo le falta llegar a su destino", añadió.

Condecorado Luis Sakoda (segundo a la derecha), junto a su esposa, Juana Sakoda; el embajador Shuichiro Megata y el congresista Rafael Yamashiro (primero a la izquierda).

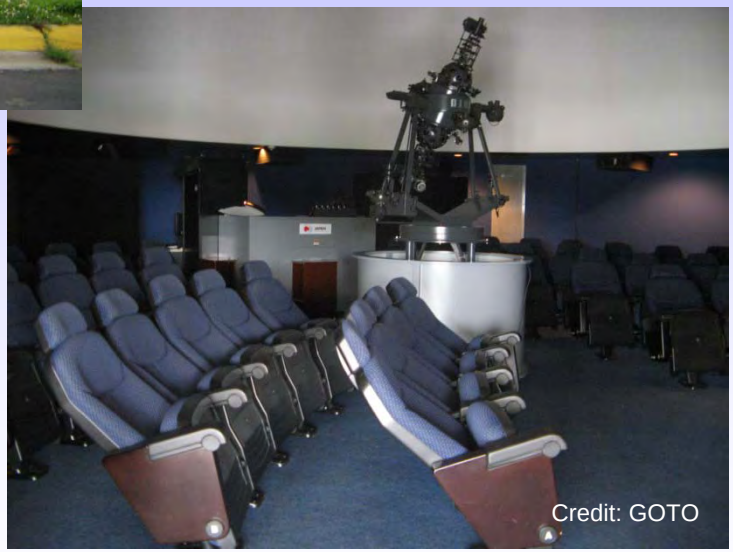
INSTITUTO GEOFISICO DEL PERU , PERU

NATIONAL ASTRONOMICAL OBSERVATORY
OF TARIJA BOLIVIA

Credit: GOTO

UNIVERSIDAD DE COSTA RICA

– **THE REPUBLIC OF COSTA RICA**

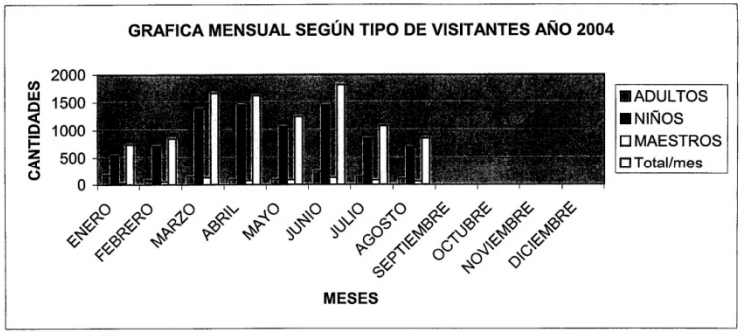

Credit: GOTO


Credit: GOTO

Astronomy lesson at Universidad de Costa Rica

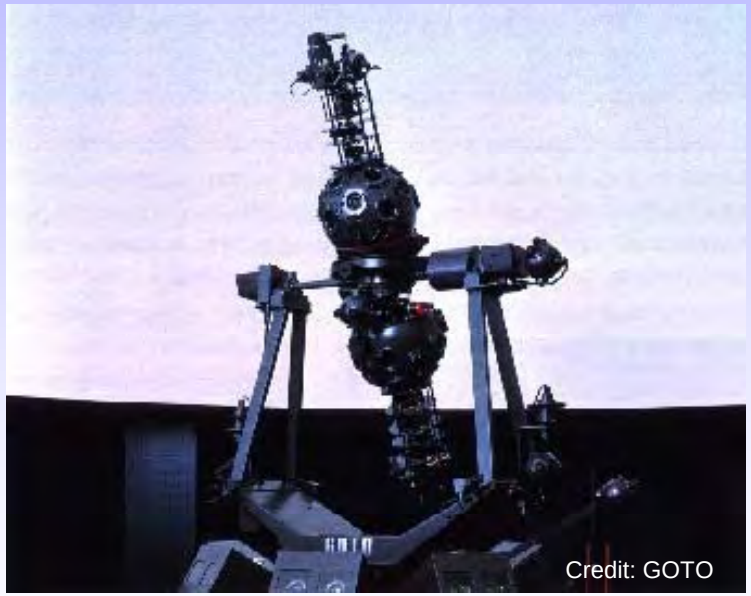
EL PEQUEÑO SULA, MUSEO PARA LA INFANCIA
GRAFICA MENSUAL SEGÚN TIPO DE VISITANTES EN EL PLANETARIO
AÑO 2004

MES	ADULTOS	NIÑOS	MAESTROS	Total/mes	No. DÍAS	PROM. X DÍA VISIT.
ENERO	172	543	27	742	11	52
FEBRERO	82	718	50	850	12	69
MARZO	147	1391	130	1,668	18	90
ABRIL	94	1451	73	1,618	15	94
MAYO	93	1063	87	1,243	19	59
JUNIO	243	1444	127	1,814	19	87
JULIO	145	850	80	1,075	21	48
AGOSTO	101	695	60	856		#¡DIV/0!
SEPTIEMBRE	0	0	0	-		#¡DIV/0!
OCTUBRE	0	0	0	-		#¡DIV/0!
NOVIEMBRE	0	0	0	-		#¡DIV/0!
DICIEMBRE	0	0	0	-		#¡DIV/0!
TOTAL	1077	8,155	634	**9,866**		



“El Pequeno Sula, Museo para La Infancia
The Republic of Honduras

Office of Havana City's Historian “Rosa Elena Simeon” Science and Technology Cultural Center



Credit: GOTO

Credit: GOTO

TIN MARIN CHILDREN‘S MUSEUM

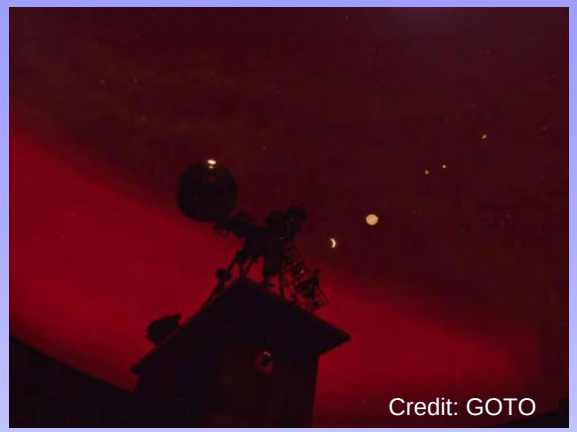

Credit: GOTO

HAYA CULTURAL CENTRE FOR CHILD DEVELOPMENT

MEGHNANDSAHA PLANETARIUM,
UNIVERSITY OF BURDWAN, INDIA

ANNA SCIENCE CENTER PLANETARIUM, INDIA

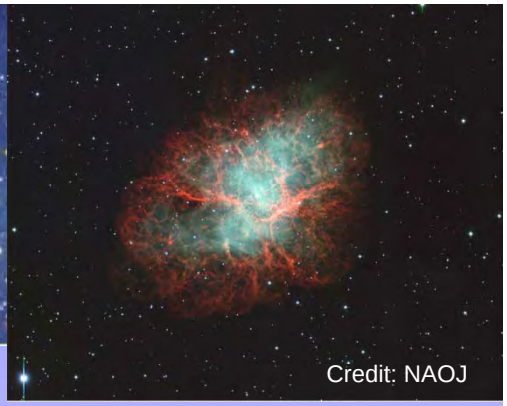
In addition to the CGA



MUSEO NACIONAL HISTORIA NATURAL

DOMINICAN REPUBLIC

Follow up assistance programmes:



Japan International Cooperation Agency (JICA);

Japanese astronomers and/or engineers are sent to give necessary technical training to the local staff members of the institutions that received the telescopes and/or planetariums.

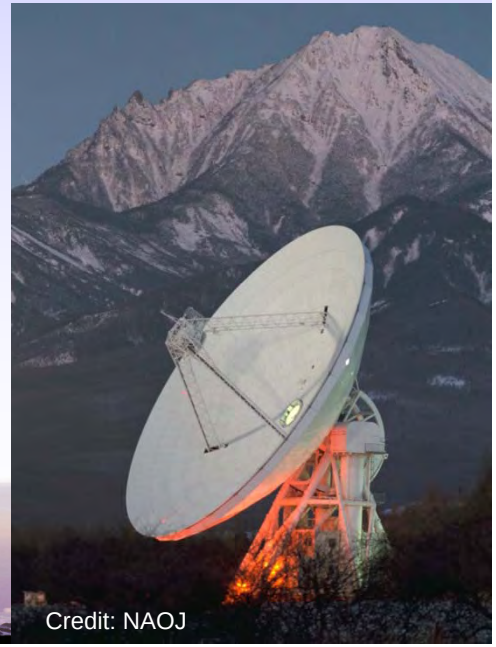
Public Observatories in Japan;

six-month astronomy research and observation training courses have been provided to staff members of the institutions that received a telescope with a CCD camera.

Assistance by the National Astronomical Observatory of Japan (NAOJ) with the IAU

1) Work with the local government to help prepare an application to the CGA.
   - Developing plans for programs.
   - Give endorsement to the application.

2) Support follow-up training.
   - Organize seminars and workshops
   - Support collaborative research projects


Credit: NAOJ

For more information

The TRIPOD concept have been developed during the last two decades of efforts by Profs. Masatoshi Kitamura, Hans J. Haubold, and many others. Additional information on this subject can be found in the following papers.

Haubold, H.J., Promoting Research and Education in Basic Space Science: the approach of the UN/ESA Workshop, Elseier, Space Policy, 19, 215 (2003)

Kitamura, M., Astronomical Herald 90, 228 (1997)

Kitamura, M., Astronomy for Developing Countries, Special Session at the 24th IAU General Assembly (Ed.) A. Batten, 312 (2001)

Kitamura M., Aiding astronomy in developing nations: Japanese ODA, Space Policy, 20,131 (2004)

Kogure, T., Astronomical Herald 90, 277 (1997)

Petrovsky, V., Space Activities of the United Nations and International Organizations (the Secretary General's report "An Agenda for Peace") United Nations, New York (1992)

Smith D.W., Haubold H.J. (Eds.) Planetarium: a challenge for educators, United Nations, New York, (1992)

Wamusteker, W., Albrecht, R., and Haubold, H. J., Developing Basic Space Science World-Wide : a decade of UN/ESA workshops, Kluwer Academic Publishers (2004)

Kitamura, M., Sekiguchi, K., Yumoto, K., and Haubold, H.J., Third UN/ESA/NASA Workshop on the International Heliophysical Year 2007 and Basic Space Science, Earth, Moon, and Planets, Volume 104, Issue 1-4, pp. 141-159 (2009)