

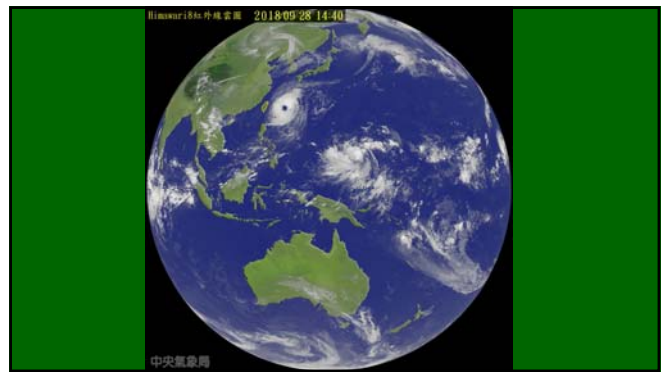
# A Journey to the West — My Sabbatical Adventures

Wen-Ping Chen (陳文屏)  
National Central University



## Itinerary

- **Guanzhou**, China, 2018.06.28~30
- **Xinjiang**, China (Xinjiang Astronomical Observatory) Urumqi, Nanshan, Muztagata, 2018.06.28-08.15
- NCU, 2018.08.15~09.02
- **Kolkata**, India (S. N. Bose Centre for Basic Sciences), 2018.09.02~08
- **Nailital** (Aryabhata Research Institute of Observational Sciences, ARIES), 2018.09.03~10.17
- **Pilani**, Birla Institute of Technology and Science (BITS), 2018.10.17~21
- NCU, 2018.10.21~



### Guanzhou 廣州

**Dwindle, Dwindle Little Stars:**  
*Hunting for Substellar Objects Young and Old Rich and Poor*

Wen-Ping Chen (陳文屏)  
National Central University

**新疆维吾尔自治区 (Xinjiang Uyghur Autonomous Region)**



Area  
 1,664,900 km<sup>2</sup>  
 = 1/6 China  
 = 1/2 India


**Xinjian Astronomical Observatory (XAO)**

- Urumqi 乌鲁木齐 (迪化) ... headquarter
- Nanshan 南山 ... established
- Qitai 奇台 TAOS/BEST ... developing
- Muztaga 慕士塔格峰 to be developed Large OIR Telescope (LOT; 10 m)



2018.07.01-05 Star Cluster Meeting @XAO  
 2018年星团研讨会

The NCU Team



Qitai 奇台  
 Nanshan 南山  
 Muztaga 慕峰

Urumqi to Nanshan 60 km  
 Urumqi to Qitai 260 km

The observatory sites in Xinjiang

**Team to Muztaga**




**Team to Qitai**





新疆奇台觀測站



奇台哈薩克族民房



哈薩克族羽羊比賽

**TAOS/BEST**

Bright-stars Exoplanet Survey by Transits (BEST) – A Progress Report

Wen-Ping CHEN 陳文屏  
(中央大學 天文所) 以及 BEST 團隊

2000/04

2017/05

Installation of TAOS Telescopes

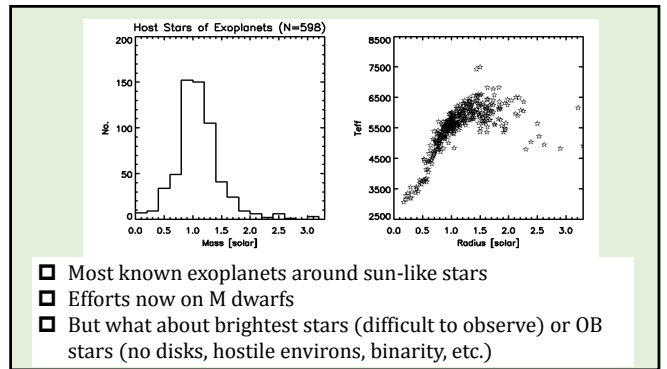
Disassembly of TAOS Telescopes

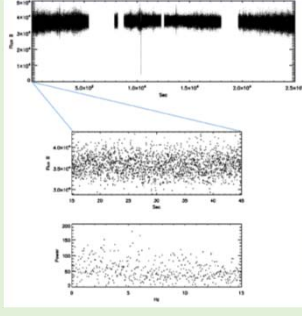
**TAOS 1**

From Lulin to Qitai

In the ASIAA basement

In the XAO basement

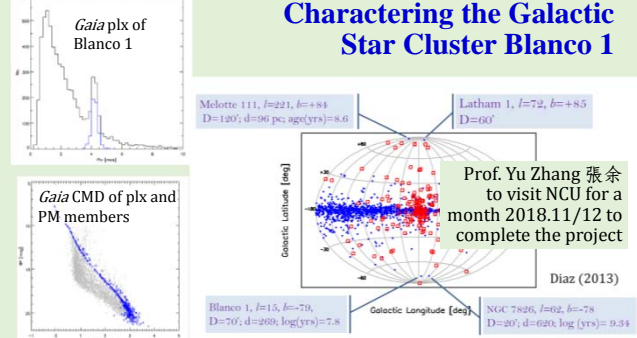




The frame-transfer CCD cameras (SI 805 SN 1021) can read out up to 70 Hz, so even very bright stars can be studied.

Fast photometry sandwiched by regular "stare" observations to detrend the light curve  
 → Stellar variability

### Charactering the Galactic Star Cluster Blanco 1



*Gaia* plx of Blanco 1

*Gaia* CMD of plx and PM members

Melotte 111,  $l=221$ ,  $b=+84$   
 $D=120'$ ,  $d=96$  pc; age(yrs)=8.6

Latham 1,  $l=72$ ,  $b=+85$   
 $D=60'$

Blanco 1,  $l=15$ ,  $b=-70$   
 $D=70'$ ,  $d=268$ ; log(yrs)=7.8

NGC 7826,  $l=92$ ,  $b=-78$   
 $D=20'$ ,  $d=620$ ; log (yrs)= 9.54

Diaz (2013)

Prof. Yu Zhang 張余 to visit NCU for a month 2018.11/12 to complete the project

20 hours of lectures

### Stellar Formation and Evolution

恆星形成與演化

Wen Ping Chen 陳文屏  
 中央大學 天文研究所  
<http://www.astro.ncu.edu.tw/~wchen/Courses/Stars/Default.htm>

科技寫作與報告

陳文屏  
 中央大學 天文所  
 2018夏@新疆天文台  
[www.astro.ncu.edu.tw/~wchen/Courses/Seminar/techwriting.pdf](http://www.astro.ncu.edu.tw/~wchen/Courses/Seminar/techwriting.pdf)

10 hours of lectures on "Technical Writing"



Wen-Ping Chen  
 8月5日 · 🌐 · 📍

Dinner party ... The boy student at the left end cooked the chicken dishes 大盤雞 ..... they were delicious ... 新疆天文台晚餐聚會

**XAO Star Formation Class 2018.07.27 (Friday) @ Chens**

Second dinner party, before I departed ...

### Dinner Party @XAO 2018.08.10



### My Badminton pals





S. N. Bose National Centre for Basic Sciences

**Bose Colloquium**

6<sup>th</sup> September, 2018 | 4pm | Fermion Hall

**DR. CHEN**  
Prof. Wen Ping Chen  
Purple Mountain Observatory, Chinese Academy of Sciences

**Title**  
Darkly, Darkly Little Stars - Hunting for Subdwarf Clump Young and Old Stars and Pops

**Abstract**  
With more than two billion com hydrogen atoms, subdwarf objects continue to cool and fade after birth. These heavier than 10 solar masses, called brown dwarfs, manage to evade detection or detection through maintaining hydrostatic equilibrium for a brief period of time. These low masses then do not undergo any nuclear reaction whatsoever in their lives and evolve like planets. In the same 1000-degree Kelvin and planetary mass objects are heated, almost all the time. In this we already spent Characterization of the youngest subdwarf objects by spectroscopy is facilitated by their similarity with other subdwarfs with their counterparts. We describe our international collaboration to select subdwarf candidates in nearby star-forming regions of a couple Myr old, when brown dwarfs are being formed in their infancy. Our survey of subdwarf populations in star clusters, with known age and distance, will provide stringent constraints on theoretical modeling of stellar atmospheres, and of interstellar extinction. We also present how their low-mass members in the most subdwarf in stellar streams to get excited, leading to eventual dissipation of star clusters.

**M 36 Open Cluster**

1000th anniversary of 1995 Star  
r = 19 parsec

**M 36 collaboration:**  
including Chen, Wen-Ping, Dutta S., Panja, A., Mondal, S. et al 2018

**30 Myr old?**

Contour levels: 3.5, 6.0, 9.0, 12.0, 16.0, 19.0, 22.0 K-axes

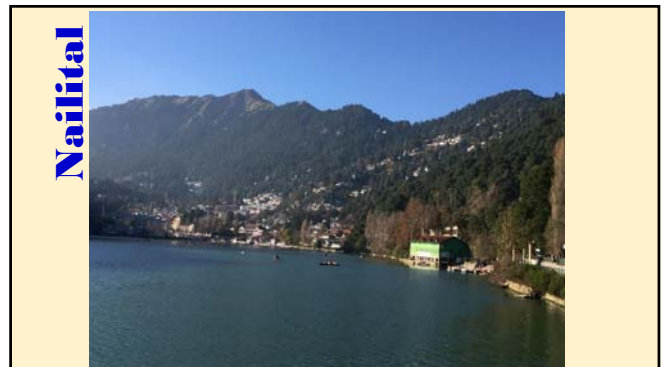
Somnath Dutta and Alik Panja visited NCU 2017/2018 for 2 months, and continued to work on M36 stars/YSOs with CO data (Purple Mt. Obs.)  
Devendra Ojha to visit NCU in March 2019

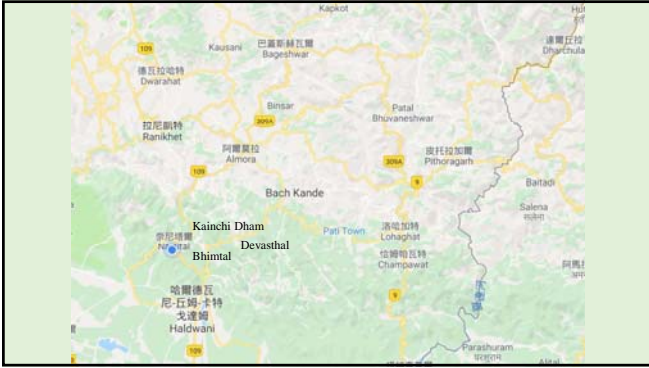


**ARIES, Nailital**

**ARIES - NCU one day seminar on October 4, 2018**

Title	Speaker	Time (hrs)
Morphological Dissection of Globular Clusters	Chin Wei Chen 陳其威	10:00 - 10:25
Searching for brown dwarfs in the Blue Ophiuch star-forming region	Pratik Chatterjee 查特吉	10:25 - 10:50
Dust formation of the stars with large near-infrared excess	Chaudhri Chiranjeev Deo 曹其德	10:50 - 11:15
Star formation activity in the NGC 225-A275 complex	Manish K. Samal 曹其德	11:30 - 11:55
Optical and X-ray Observations of the Nova Eridani 2009	Vinay Li-Wen Hung 洪文英	11:55 - 12:20
Million second Infrared Observations by the Lunar Occultation Technique	Ping-Fang Wang 王品芳	12:20 - 12:45
Variable Stars & Period Search Methods	Ding-Feng Cheng 程定峰	14:30 - 14:55
Polytropic studies towards young star cluster regions	C. Eswara 埃斯瓦	14:55 - 15:20
Young stellar population in NGC 2175 and W3 star-forming regions	Jayraj Kulkarni 庫爾尼	15:30 - 15:45
Searching for Young E objects in Galactic Open Clusters	Selma Chia-Ling Ho 何宜玲	16:00 - 16:25
Star formation in high-ionization clouds and cluster associated with HII regions	Norlam Chaudhri 曹其德	16:25 - 16:50





### Devasthal Observatory

El=2450 m  
Seeing 0.6"

The 3.6 m telescope,  
the largest in Asia

4 m liquid mirror

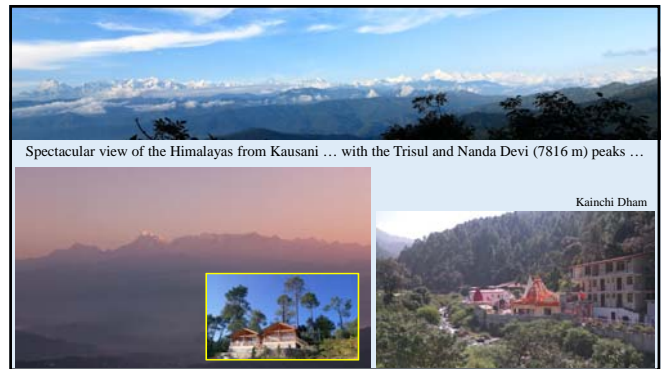
1.3 m DFM

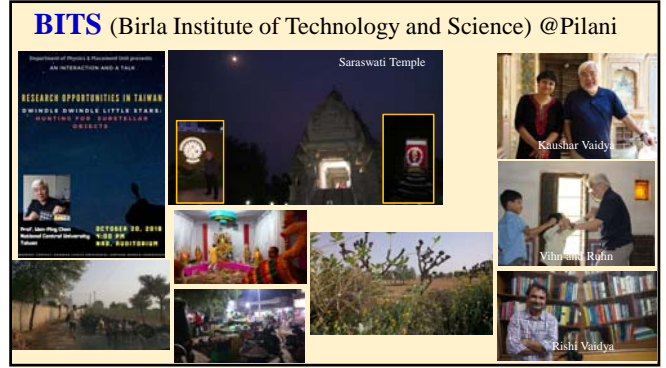
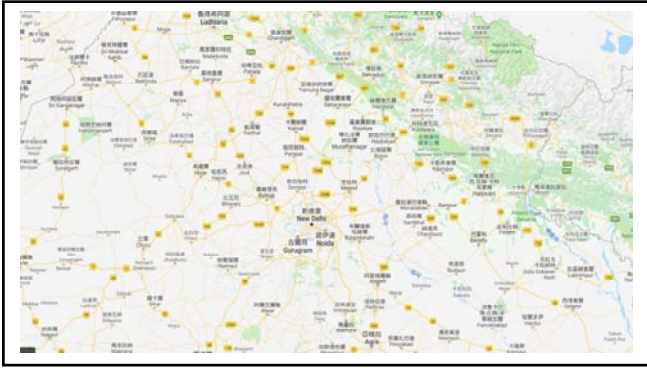
Site aerial video



Neelam Panwar and Anil Pandey

October 4, Colloquium on BDs  
NIR spectroscopy (0.6 to 2.5 micron) on bright  
BDs (with Neelam Panwar and Anil Pandey)  
Imaging of BD pairs (with Saurabh Sharma)  
Stellar variability in star clusters (with Sneha Lata)  
Prof. Pandey to visit NCU starting June 2019?





**EDEN (Exoearth Discovery and Exploration Network)**

Paul Ho <pho@asiaa.sinica.edu.tw> 2018年6月15日 上午11:44  
 收件者: Shiang-Yu Wang <sywang@asiaa.sinica.edu.tw>, Chen Wen-Ping <wchen@astro.ncu.edu.tw>  
 副本: Paul Ho <pho@asiaa.sinica.edu.tw>

dear wen-ping and shiang-yu, do we have any interest in taiwan to join such a search? I think it is to provide around-the-clock coverage.

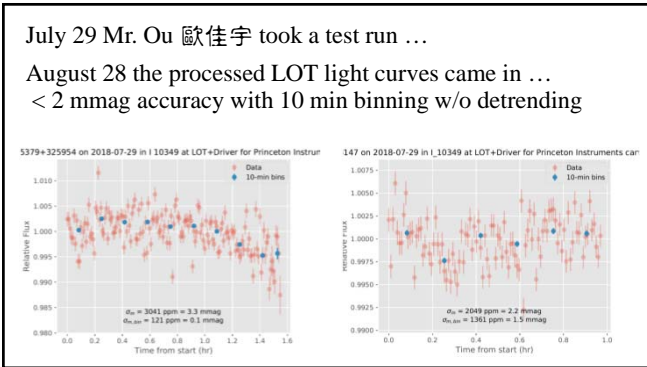
best, p

----- Forwarded message -----  
 From: Thomas Henning <thinning@mpia.de>  
 Date: Thu, Jun 7, 2018 at 7:33 AM  
 Subject: Potential collaboration  
 To: Paul Ho <pho@asiaa.sinica.edu.tw>, "Apai, Daniel - (apai)" <apai@email.arizona.edu>, Thomas Henning <thinning@mpia-hd.mpg.de>

Dear Paul,

How are you doing? I hope things are getting better back home and you will find time to visit MPIA over the summer.

I am contacting you to explore your interest in a potential collaboration with us. Daniel Apai who is a Professor at the University of Arizona is setting up a project to search for habitable planets in the solar neighbourhood, with a network



>>>> Original Message <<<<<<  
**From:** Daniel Apai  
**To:** Wen-Ping Chen  
**Cc:** Thomas Henning; Paul Gabor  
**Sent Date:** Tue, 28 Aug 2018 23:29:00 Asia/Taipei  
**Subject:** EDEN data analysis and next steps

Dear Wen-Ping (cc: Thomas, Paul),

we have completed a preliminary reduction and photometry of the Lulin datasets. Although further improvements in the future can be reached through de-trending (we are exploring several methods), the current reduction is already good enough to verify that the data are good quality and that the photometry will work well for the purposes of our survey.

I attached two PDF files with reduced lightcurves. These were taken for actual EDEN targets, late and fainter red dwarfs, and reach about <2mmag precision for 10-minute bins. We believe that with longer datasets and de-trending the photometry will improve further.

I wanted to let you know that we are glad to proceed with the process of NCU joining EDEN. I will be in touch with the next steps.

In addition, I wanted to let you know that we are preparing an online funding inquiry (pre-proposal) for the John Templeton Foundation. Anticipating that NCU is joining EDEN, we included a component (grad student support) for NCU in the draft budget. I plan to send you a draft shortly.

Best wishes,  
 Daniel

- ◆ NCU joins as a major partner (contributing 1-m class telescope time > 100 nights per year) along with U of Arizona/Steward Obs., Vatican Obs., & MPIA, plus several minor partners.
  - ◆ To monitor nearby late-type M dwarfs to search for (transiting events by) exoplanets in the habitable zones
  - ◆ To follow up *TESS* discoveries
  - ◆ The first run in Sep: 3/5 clear nights with LCs of two targets. Next run in Oct 3/5.
- You are invited ... for exoplanet science, for stellar variability, etc.

Contents lists available at ScienceDirect  
**New Astronomy**  
 Journal homepage: www.elsevier.com/locate/newast

**Star formation toward the H II region IRAS 10427-6032**  
 Knaushar Vaidya<sup>a,\*</sup>, Souradeep Bhattacharya<sup>a,b</sup>, Vatsal Panwar<sup>a,c</sup>, Manish R. Samal<sup>d</sup>, Wen-Ping Chen<sup>e</sup>, Devendra K. Ojha<sup>f</sup>

**ABSTRACT**  
 The formation and properties of star clusters formed at the edges of the H II regions are poorly known. In this paper, we study stellar content, physical conditions, and star formation progress around a relatively unknown young H II region IRAS 10427-6032, located in the southern outskirts of the Carina Nebula. We study this region by making use of the most infrared (near-IR) data from VISTA, and infrared (mid-IR) from Spitzer and WISE, far-infrared (far-IR) from Herschel, sub-mm from ATLASGAL, and 843 MHz radio continuum data. Using multi-band photometry, we identify a total of 43 Class I and 29 Class II young stellar objects (YSOs) candidates, most of which were identified in the 'V' or 'F' region centered on the IRAS source position. Modelling of the spectral energy distribution for selected YSO candidates using the radiative transfer models shows that most of these candidates are intermediate mass YSOs in their early evolutionary stages. A majority of the YSO candidates are found to be consistent with the cold dense clump at the western rim of the H II region. Lyman continuum luminosity calculation using radio emission indicates the spectral type of the ionizing source to be earlier than B0.5-B1. We identified a candidate massive star possibly responsible for the H II region with an estimated spectral type B0-B0.5. The temperature and column density map of the region constructed by performing joint near- and mid-IR blackbody fits to the thermal dust emission using the far-IR data from the Herschel show a high column density shell-like morphology around the H II region, and low column density ( $\sim 10^{21} \text{ cm}^{-2}$ ) and high temperature ( $\sim 20 \text{ K}$ ) matter within the H II region. Based on the morphology of the region in the ionized and the molecular gas, and the comparison between the estimated ionization of the H II region and the YSO candidates in the clump, we argue that the enhanced star formation at the western rim of the H II region is likely due to compression by the ionized gas.

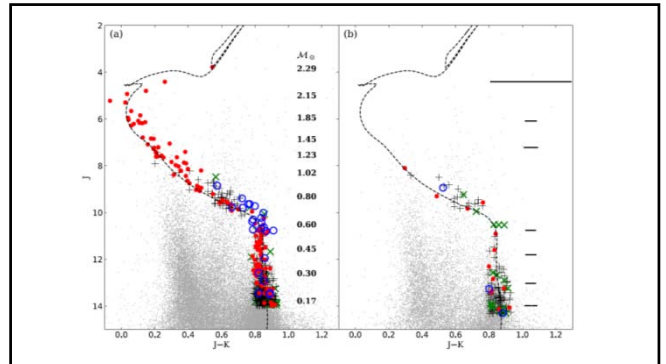
THE ASTROPHYSICAL JOURNAL, 862:106 (26pp), 2018 August 1  
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**Characterization of Stellar and Substellar Members in the Coma Berenices Star Cluster**

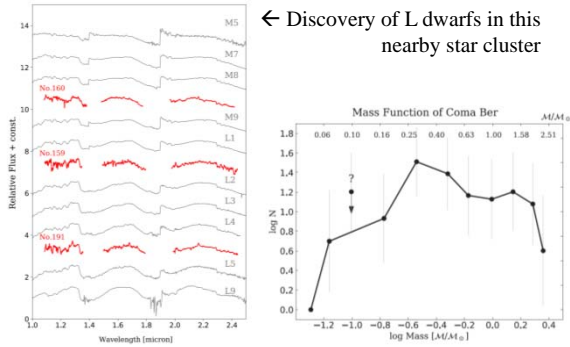
Shih-Yun Tang<sup>1</sup>, W. P. Chen<sup>1,2</sup>, P. S. Chiang<sup>3</sup>, Jessy Jose<sup>4,5</sup>, Gregory J. Herczeg<sup>6</sup>, and Bertrand Goldman<sup>6</sup>  
<sup>1</sup>Department of Physics, National Central University, 300 Zhongda Road, Zhongli, Taoyuan 32001, Taiwan  
<sup>2</sup>Graduate Institute of Astronomy, National Central University, 300 Zhongda Road, Zhongli, Taoyuan 32001, Taiwan  
<sup>3</sup>Kavli Institute for Astronomy and Astrophysics, Peking University, Yi He Yuan Lu 5, Haidian District, Beijing 100871, People's Republic of China  
<sup>4</sup>Department of Physics, Indian Institute of Science Education and Research, Ramli Road, Kharakambhal Road, Mangalam (P.O.) Tirupat 517507, India  
<sup>5</sup>Max Planck Institute for Astronomy, Königstuhl 15, D-69117 Heidelberg, Germany  
<sup>6</sup>Université de Strasbourg, CNRS, Observatoire astronomique de Strasbourg, UMR 7550, F-67000 Strasbourg, France  
 Received 2018 March 7; revised 2018 June 4; accepted 2018 June 4; published 2018 July 27

**Abstract**

We have identified stellar and substellar members in the nearby star cluster Coma Berenices, using photometry, proper motions, and distances of a combination of 2MASS, UKIDSS, URAT1, and *Gaia*/DR2 data. Those with *Gaia*/DR2 parallax measurements provide the most reliable sample to constrain the distance, averaging 86.7 pc with a dispersion of 7.1 pc, and age of ~800 Myr of the cluster. This age is older than the 400–600 Myr commonly adopted in the literature. Our analysis, complete within 5° of the cluster radius, leads to identification of 192 candidates, among which, after field contamination is considered, about 148 are true members. The members have  $J - K$  from ~3 mag to ~17.5 mag, corresponding to stellar masses 2.3–0.06  $M_{\odot}$ . The mass function of the cluster peaks around 0.3  $M_{\odot}$ , and in the sense of  $dN/dm \propto m^{-\alpha}$ , where  $N$  is the number of members and  $m$  is stellar mass, with a slope  $\alpha \approx 0.49 \pm 0.03$  in the mass range 0.3–2.3  $M_{\odot}$ . This is much shallower than that of the field population in the solar neighborhood. The slope  $\alpha = -1.69 \pm 0.14$  from 0.3  $M_{\odot}$  to 0.06  $M_{\odot}$ , the lowest mass in our sample. The cluster is mass-segregated and has a shape elongated toward the Galactic plane. Our list contains nine substellar members, including three new discoveries of an M8, an L1, and an L4 brown dwarfs, extending from the previously known coolest members of late-M types to even cooler types.



← Discovery of L dwarfs in this nearby star cluster



THE ASTROPHYSICAL JOURNAL, 156:115 (11pp), 2018 September  
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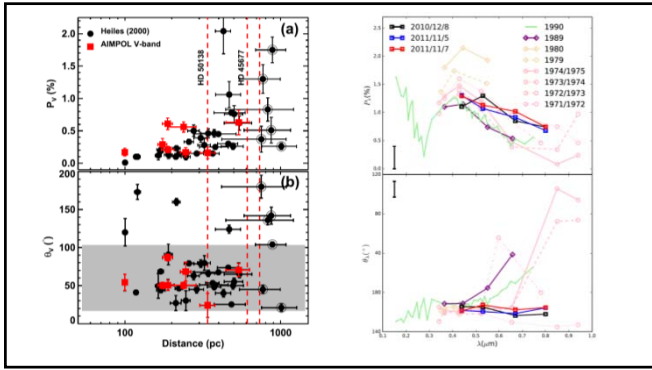
**A Multicolor Study of Polarization Variability in Isolated B[e] Stars HD 45677 and HD 50138**

李建德  
 C. D. Lee<sup>1</sup>, C. Eswaraiah<sup>1,2,3</sup>, W. P. Chen<sup>1,4</sup>, and A. K. Pandey<sup>2</sup>  
<sup>1</sup>Graduate Institute of Astronomy, National Central University, 300 Zhongda Road, Zhongli 32001, Taiwan  
<sup>2</sup>Aryabhata Research Institute of Observational Sciences, Mairata Peak, Nainital 263129, India  
<sup>3</sup>Institute of Astronomy, National Tsing-Hua University (NTHU), Hsinchu 30013, Taiwan  
<sup>4</sup>Department of Physics, National Central University, 300 Zhongda Road, Zhongli 32001, Taiwan  
 Received 2018 June 25; accepted 2018 July 13; published 2018 August 23

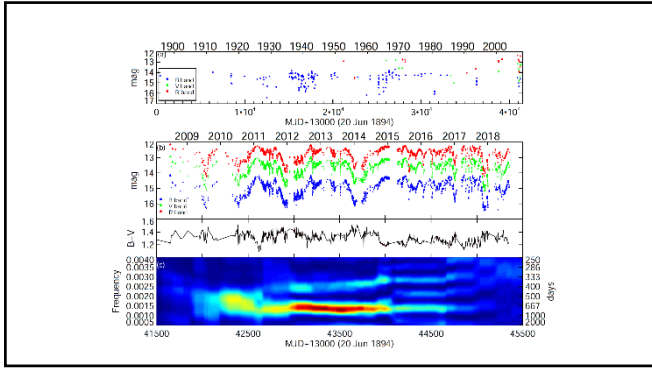
**Abstract**

HD 45677 and HD 50138 are two B[e] stars isolated from any known star-forming regions. We investigated the polarization characterization of their surrounding gas and in situ dust in the inner edge of the circumstellar disk. Our measurements of the intrinsic polarization of each star between 2010 and 2011, after correcting for foreground polarization through field star observation, reveal a decreasing level of polarization with wavelength, with the polarization angle independent of wavelength. However, reanalysis of literature data by applying our foreground correction method clarified the relative roles of electron scattering versus dust scattering in the circumstellar disk. Combining the multicolor data from the available epochs led us to conclude that a general electron scattering-dominated disk exists in both B[e] stars, with evidence of micron-sized grains seen at some epochs, likely condensed in the inner disk.





Binary systems, November 10, 2018  
 Preprint, not certified by peer review  
 Huang et al. 2018  
 Accepted for publication in MNRAS  
 2  
 Huang et al.  
 Department of Astronomy and Astrophysics, Tsinghua University, Beijing, 100084, China  
 Institute of Astronomy and National Astronomical Observatory, Peking University, Beijing, 100871, China  
 Department of Applied Physics, Tsinghua University, Beijing 100084, China  
 Department of Applied Physics, Tsinghua University, Beijing 100084, China  
 ABSTRACT  
 We present the results of a multi-wavelength monitoring campaign of the T Tauri star system JW 560, located at a distance of  $\sim 160$  pc. We observe the system in the near-infrared (NIR) and mid-infrared (MIR) regions from 2009 to 2018. We detect a significant increase in the NIR flux density in 2016, which is associated with a flare event. We also detect a significant increase in the MIR flux density in 2016, which is associated with a flare event. We discuss the physical processes that lead to these observations and their implications for the evolution of the system.



The JCMT Tensort Survey: An Extraordinary Submillimetre Flare in the T Tauri Binary System JW 560  
 RISHI MAHAI<sup>1</sup>, BHASKAR LAKSHMINARAYANAN<sup>2</sup>, GUYERIN T. BORTON<sup>3</sup>, JAN FRANKEN<sup>4</sup>, CHRISTOPH S. BELL<sup>5</sup>, GUYERIN T. BORTON<sup>6</sup>, ANDREW S. WATSON<sup>7</sup>, J. RICHARD LEE<sup>8</sup>, AND  
 ALAN W. LAM<sup>9</sup>  
<sup>1</sup>East Asian Observatory, 660 N. Aohoku Place, Hilo, HI 96720, USA  
<sup>2</sup>Graduate Institute of Astronomy, National Central University, 300 Jhuang Road, Chungli, Taoyuan 32002, Taiwan, P.R. China  
<sup>3</sup>Kaula Institute of Astronomy and Astrophysics, 631 91 Aohoku Place, Hilo, HI 96720, USA  
<sup>4</sup>Center for Astrophysics Research, School of Physics, Astronomy and Mathematics, University of Derby, Leithers Road, Derby, Derbyshire, DE24 2AE, UK  
<sup>5</sup>Kaula Institute for Astronomy and Astrophysics, Peking University, Yizhuang East 1, Beijing 101307, China  
<sup>6</sup>ARC Research Astronomy and Astrophysics, MPI Wael Research 84, Victoria, BC, Canada  
<sup>7</sup>Department of Physics and Astronomy, University of Victoria, Victoria, BC, Canada  
<sup>8</sup>School of Space Research, Kyung Hee University, Chungdeong-do, Yongin-si, Gyeonggi-do, Korea  
<sup>9</sup>Leiden Observatory, Leiden University, P.O. Box 9510, 2300 LB, The Netherlands  
 The binary T Tauri system JW 560 in the Orion Molecular Cloud underwent an energetic, short-lived flare observed at submillimetre wavelengths by the SCUBA-2 instrument on 20 November 2016 (UT). The emission faded by nearly 50% within the 31 minute integration. The simultaneous source fluxes at 850  $\mu\text{m}$  and 450  $\mu\text{m}$  were  $466 \pm 10 \text{ mJy beam}^{-1}$  and  $107 \pm 10 \text{ mJy beam}^{-1}$ , respectively. The 850  $\mu\text{m}$  flux corresponds to a radio luminosity of  $L_r = 8 \times 10^{33} \text{ erg s}^{-1} \text{ Hz}^{-1}$ , approximately one order of magnitude higher (in terms of  $L_r$ ) than that of a flare of the young star GMR-A, detected in Orion in 2003 at 3mm. The event may be the most luminous known flare associated with a young stellar object and is also the first coronal flare discovered at sub-mm wavelengths. The spectral index between 450  $\mu\text{m}$  and 850  $\mu\text{m}$  of  $\alpha = 0.11$  is broadly consistent with non-thermal emission. The brightness temperature was in excess of  $10^4 \text{ K}$ . We interpret this event to be a magnetic reconnection that energized charged particles to emit gyrosynchrotron/synchrotron radiation.

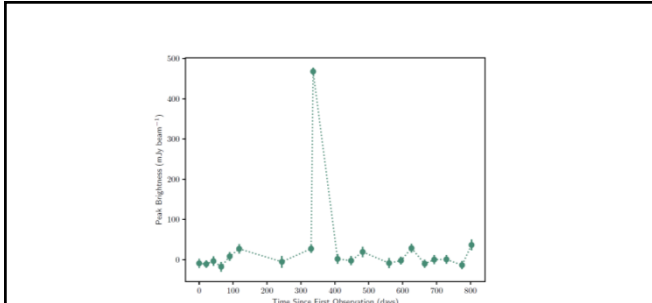


Figure 2. The 850  $\mu\text{m}$  light curve of JW 560 over all observed epochs (see Table 2.1).

Astronomy & Astrophysics manuscript no. output  
 October 2, 2018  
 @ESO 2018  
 LETTER TO THE EDITOR  
**The blue straggler population of the old open cluster Berkeley 17**  
 Souradeep Bhattacharya<sup>1</sup>, Kamshir Vaidya<sup>2</sup>, R. V. Smith<sup>3</sup>, and Giacomo Beccari<sup>4</sup>  
<sup>1</sup> European Southern Observatory, Karl-Schwarzschild-Str. 41, 85748 Garching, Germany  
 e-mail: sbhatt@eso.org  
<sup>2</sup> Department of Physics, Birla Institute of Technology and Science, Pilani (R3031), Rajasthan, India  
<sup>3</sup> Graduate Institute of Astronomy, National Central University, 300 Jhuang Road, Chungli, Taiwan  
 Submitted October 2018  
 ABSTRACT  
 Content. Blue Straggler Stars (BSSs) are observed in globular clusters (GCs) and old open clusters (OCs). Their radial distribution has been used as an indicator of dynamical evolution in GCs. Berkeley 17 (Ber17) is the oldest known OC whose members, including BSSs, can now be identified with Gaia DR2. We identify members of Ber17 from the Gaia DR2 proper motions and parallaxes to find the BSSs population and its radial distribution to understand its dynamical evolution.  
 Methods. Using the proper motion and parallax information of Gaia DR2 counterparts of known members of Ber17, we select cluster members to populate the colour-magnitude diagram (CMD) in Gaia filters. Cluster properties are then derived using brightest members, and the BSSs and giant branch stars are identified. We obtain the radial distribution of BSSs with respect to the giant branch stars and also compare the BSSs population with respect to a reference population using a Minimum Spanning Tree (MST) method. Finally, we place Ber17 at 3138.6 $^{+0.2}_{-0.2}$  pc. We find 23 BSSs in Ber17, only two of which were previously identified. We find a bimodal radial distribution of BSSs with a minima at  $r_{\text{min}} = 3.12$ , supported by the findings from the MST method.  
 Conclusions. The BSSs are not clearly bifurcated in the CMD but do seem to follow two sequences, corresponding to two separate formation channels. The bimodal radial distribution of BSSs indicates that they have just started to sink towards the center of Ber17. This is the first such determination for an OC.

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### Variable stars in the star-forming region towards IC 5070

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**ABSTRACT**  
 We present original long series photometry of 95 variable stars in the young star-forming region towards the Pelican Nebula (IC 5070). We classify the variable sources based on their light curves, the color-color and color-magnitude diagrams using optical photometric data. Their physical association with the cluster IC 5070 is established based on the parallaxes and proper motions from the *Gaia* second data release. We find that around 70 of these variables are pre-main-sequence stars while nearly 20 variables are candidate main-sequence or field stars. Most of the pre-main-sequence variables are classified as classical T Tauri stars while 7 stars show strong periodic variability consistent with weak-line T Tauri stars. We also calculated the physical parameters of the variable stars using spectral energy distribution fitting tool as well as optical color-magnitude diagram. The typical age and mass of the pre-main-sequence variables is found to be  $\leq 5$  Myr and  $\leq 2 M_{\odot}$ , respectively.

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### Brown Dwarfs in LAMOST Survey: from late M to L stars

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**ABSTRACT**  
 We present a list of brown dwarfs serendipitously found in the LAMOST spectral sky survey. The stars with LAMOST spectra showing late-M types, typically with lower signal-to-noise than brighter targets, are analyzed with broad-band photometric colors to ascertain their brown dwarf nature.

*One of the English versions, by Arthur Waley, published in 1942, 'Adventures of the Monkey God'*

*An adventurous novel published in the Ming Dynasty in the 16<sup>th</sup> century, with authorship often attributed to 吳承恩 (1506~1582)*

**西遊記**

A portrait of Xuanzang (玄奘, 602–664, "Tripitaka" in Sanskrit), the pilgrim who traveled to India, passing Pakistan, Nepal, Bangladesh, spending 18 years, to bring sacred scriptures of Buddhism back to China.

Sun Wukong (孫悟空) the rebel body guard

**A Monkey God Temple**

### Conclusions

- It was a fruitful adventure, scientifically and culturally, by visiting many places, meeting with old acquaintances, making new ones, and teaching under different settings.
- "What matters is not how many hours you work in a day; it is how long you get to concentrate in a stretch."
- My geographical ignorance has been alleviated a bit; my experience with the Chinese and Indian ways of living has deepened and broadened. Languages in Thailand, Bhutan, Nepal, Myanmar, etc.
- The monk, now with the scriptures, is fully energized.