Women in Astronomy in China

Xiangqun Cui
NIAOT/NAOC

A long history of feudal society in China

- “Women without talent is a virtue”
- Women lived in very low social position

Chinese morden astronomy
started in the period of
the anti-feudalism and anti-imperialism “May 4th Movement”,
advocate science, democracy and equality of women and men.

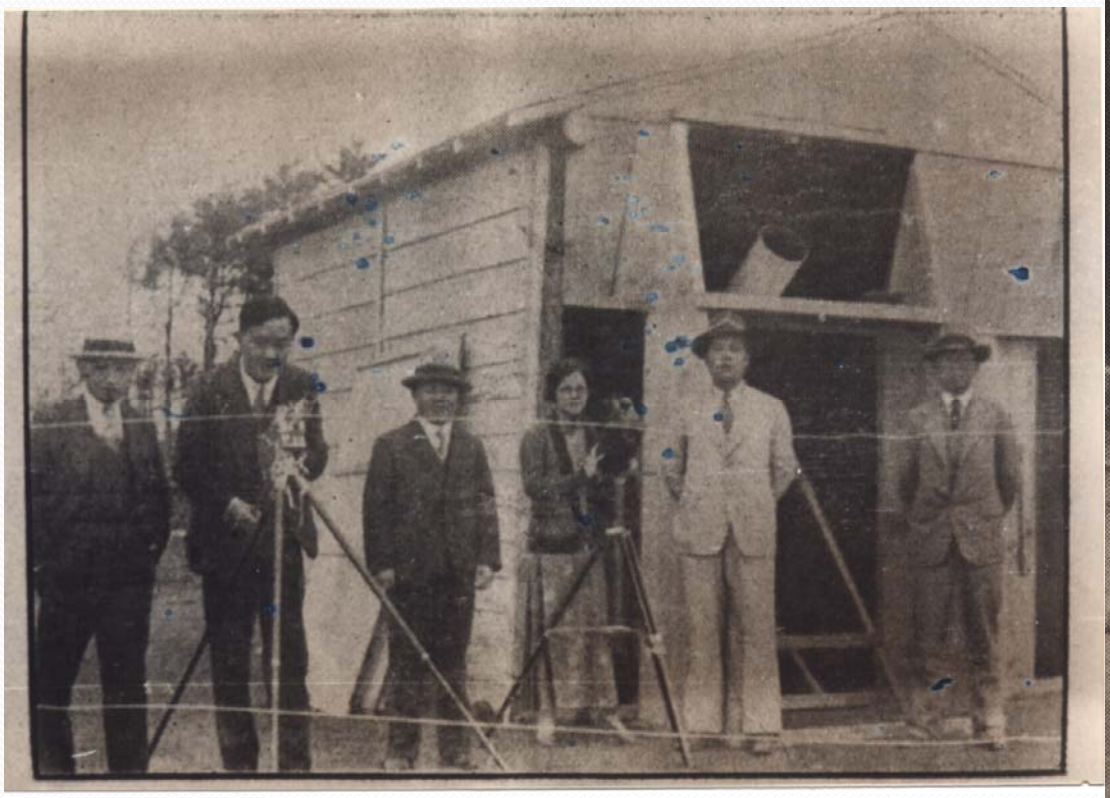
Establiment of Chinese Astronomical society Oct. 30 1922

中國天文學會第一屆年會
民國十二年十月二十八日攝於北京中央觀象臺

The first female astronomer in China

— Yixin Zou(邹仪新)

In 1936, Total solar eclipse observation in Japan



The first female astronomer in China
– Yixin Zou(邹仪新)

- 1932, graduated from zhongshan (sun yat-sen) university, department of astronomy.
- 1935 , practiced in observatory in Japan .
- 1936, took part in Japan a total eclipse observation.
- Teaching staff in sun yat-sen university, and the observatory director.
- 1948 to 1949, studied and worked in British royal Greenwich observatory, Edinburgh observatory and solar physics observatory.
- 1951. science researcher at the purple mountain observatory.
- 1957 to 1958 studied in the general observatory of Soviet union.
- 1958 sciences researcher at the Beijing observatory,

  Director of the latitude station of Beijing Observatory.

  Proposed a new method to determine the the spiral cycle value of the zenith instrument . Providing the polar coordinates for China. Published paper more than 20 articles on the latitude change, the pole shift, and the sun.

  Chief editor “the sun geophysical data” (Vol.5-Vol.12).

  The royal astronomical society honorary members, member of IAU, council member of CAS, vice president of the Beijing astronomical society.

- Astronomer in China: more than 2000; about 800 with senior titles

- **Women astronomer in China: more than 500; about 150 with senior titles**

SHUHUA YE

叶淑华

- Professor, a senior Chinese Academician and a famous astronomer in China.
- The former Director of SHAO from 1981 to 1993
- Elected as the Twentieth IAU Vice President in 1988
- Research Interests: universal time settings and the earth's rotation.
- Main achievements:

(1) Establishment of the Universal Time (UT) Service System

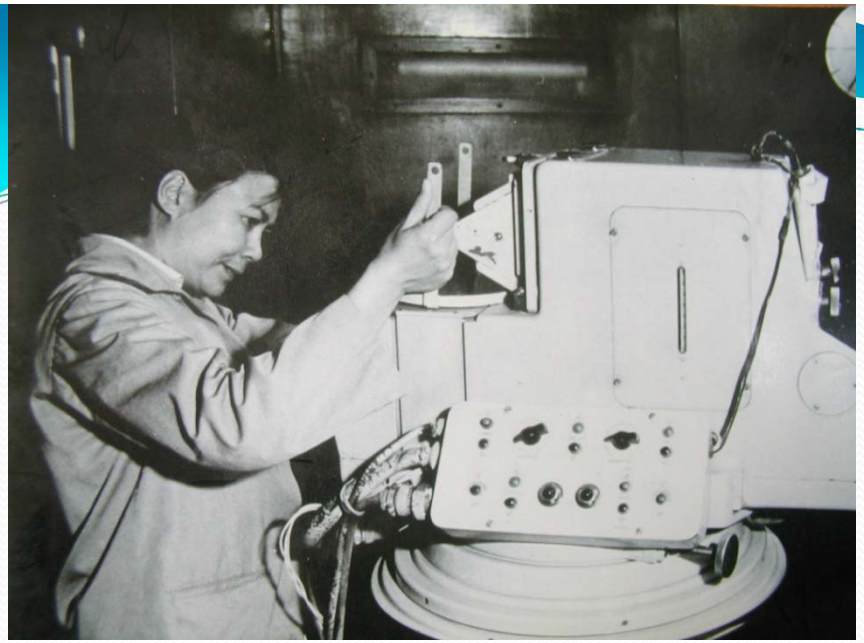
(2) Construction of VLBI Network in China

(3) Origination of a new cross-subject——Astrogeodynamics

(4) Sponsor of the Asia-Pacific Space Geodynamics Program

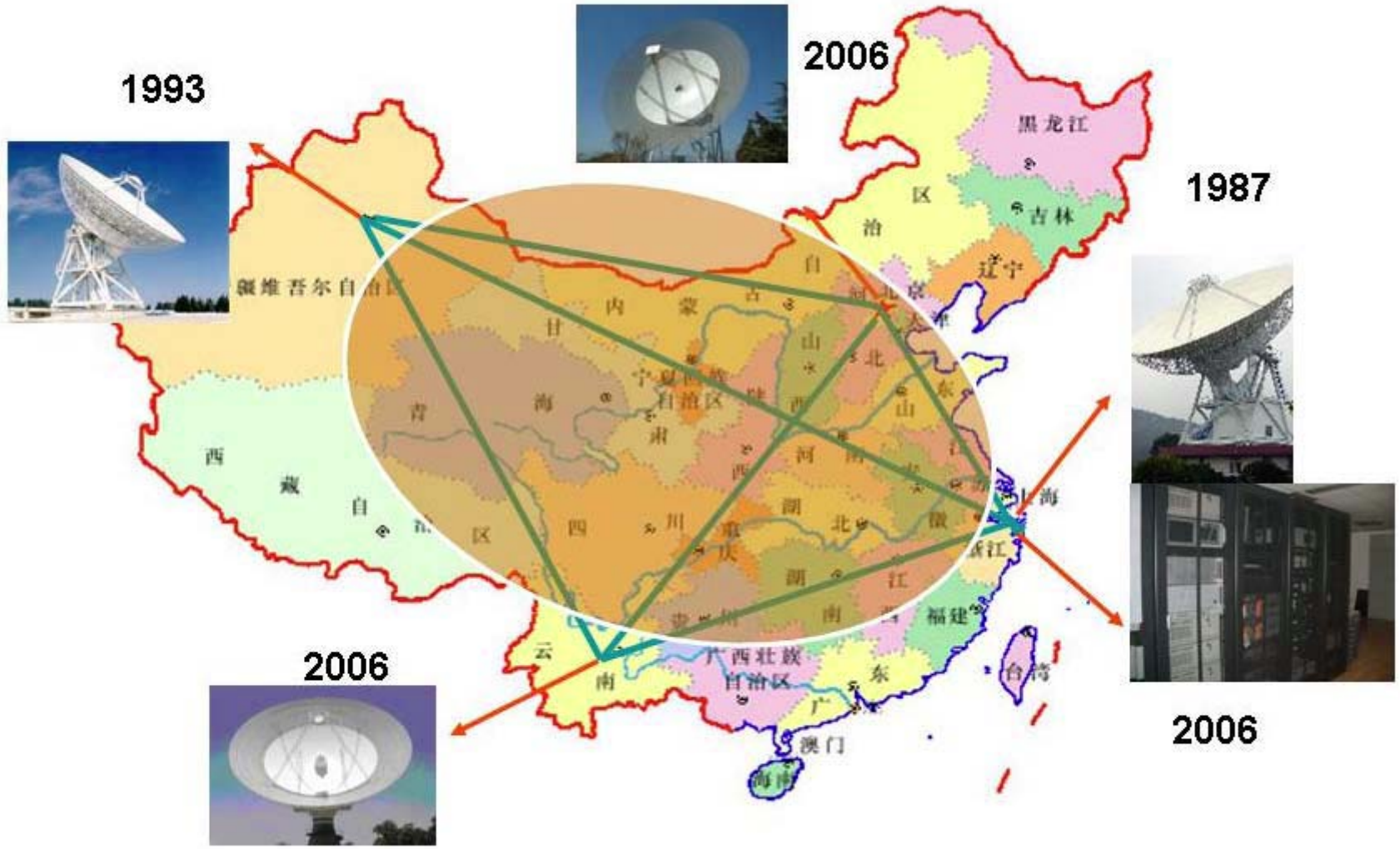
(5) Construction of 65-meter radio telescope

(6) Initiation of VLBI for Chinese Lunar Probe tracking



25m Radio Telescope for VLBI

中国VLBI网


1993
2006
1987
2006
2006
黑龙江
吉林
辽宁
内蒙古
甘肃
青海
西藏
四川
重庆
湖北
湖南
福建
广西壮族自治区
云南
广东
台湾
澳门
海南

Zhenru Wang

汪珍如

Prof. Univ. of Nanjing

- One of the pioneering Chinese astronomers in high-energy astrophysics.
- **Research Interests**:

(1) Supernovae

(2) supernova remnants

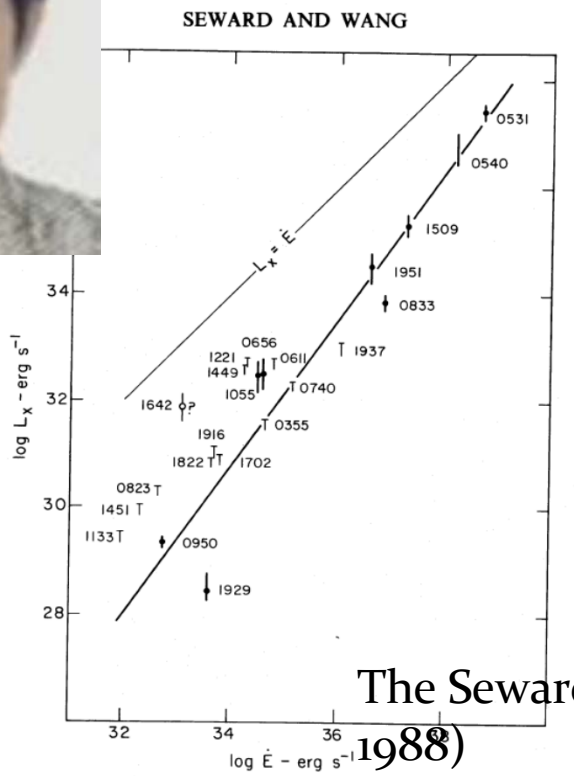
(3) neutron stars

- **Main achievement:**

(1) With Fred Seward at CfA derived an mpirical relation between the X-ray uminosities of the supernova remnants nd the pulsars inside and the rotational nergy loss rate of the pulsars, i.e., the amous "Seward and Wang relation".

Collaborating with Japanese stronomers, she discovered hard X-ray >20 keV) radiation from the supernova emnant IC 433 for the first time.

She also did excellent work on the ssociation between high-energy ources and the guest stars in the hinese astronomical records.



The Seward and Wang relation (ApJ, 332, 199, 1988)

Yuefang Wu 吴月芳

Prof.

Dept of Astronomy

Beijing Univ.

- **Research Interests**:

(1) Molecular clouds and star formation for more than thirty years. Including Energetics of Molecular Clouds, motions in low mass cores, searches for massive dense cores, high velocity bipolar molecular outflows and collapse of high mass star formation regions.

(2) To probe stages of gas cores and processes of star formation, she employed domestic telescopes such as 13.7 m of PMO, 25 m of Shanghai O. and 25 m of XinJiang O..She also employed equipment abroad such as NRAO 12 m, KOSMA, Effelsberg 100 m, JCMT, IRAM 30 m, and VLA, and SMA with collaborations.

(3) Recent research focus is the in depth study of Galactic Cold Cores of Planck Early Results.

- **Achievements**

(1) The awards she won include the 4th excellent Science-Technology result prize

(2) excellent teaching (1996) of Peking University

(3) Excellent teacher (2010) of Astronomy Department of Peking University

(4) the second prize of Natural Science Prize offered by Education Ministry of China (2011).

(5) 106 papers published in refereed journals.

XIANGQUN CUI

崔向群

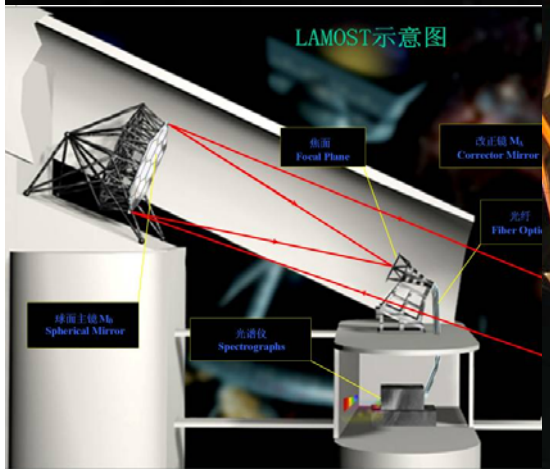
- Professor,
- Chinese Academician
- Member of academic of science for Third World
- President of the Chinese Astronomical Society
- The former vice director of NAOC, Director of NIAOT/NAOC
- Research Interest: Astronomical Optics
- **Main contribution and interested fields:**

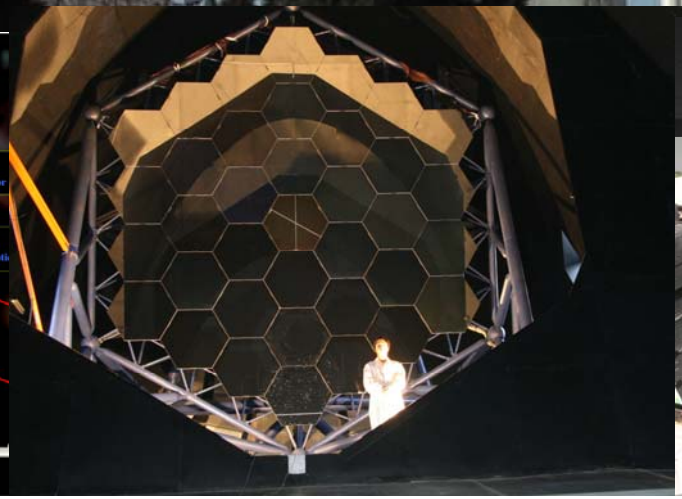
(1) Developed the Guoshoujing Telescope (LAMOST)

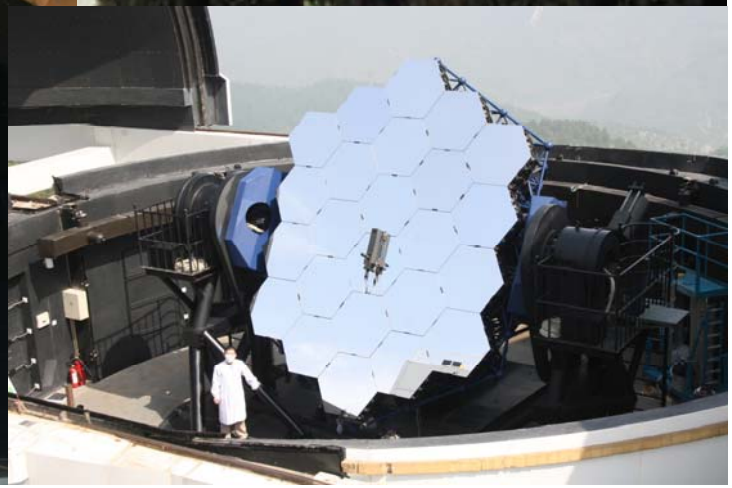
(2) Initiated the Chinese Antarctic astronomy research in DOME A

(3) Develop key technologies for ELT

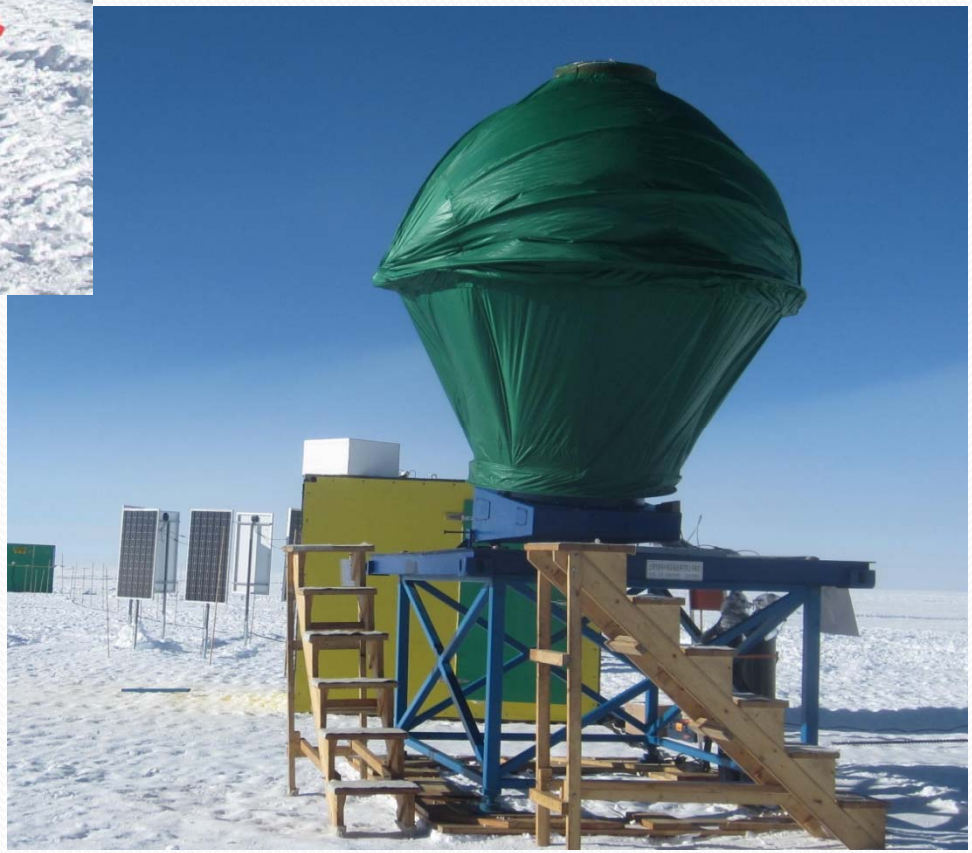
The Large Sky Area Multi-Object Fiber Spectroscopic Telescope (LAMOST)



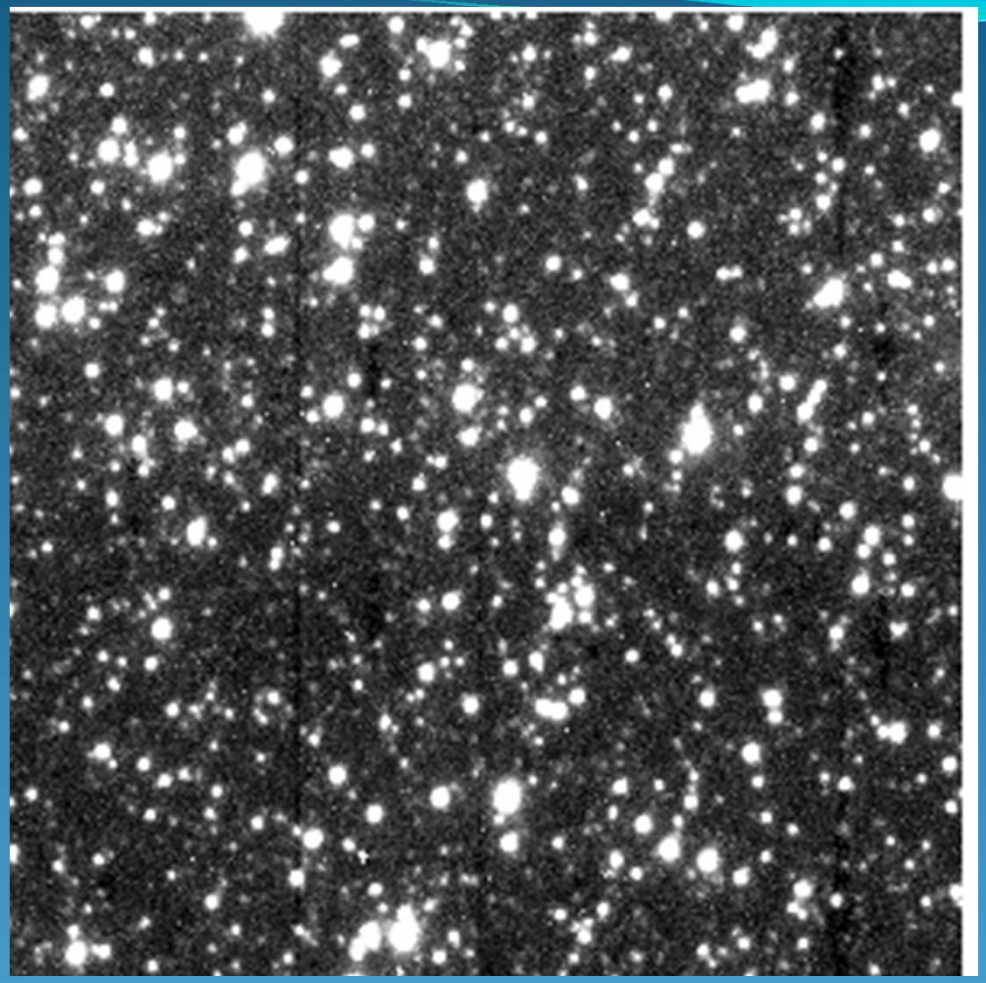




AST3-1
Aperture: 50cm
FOV: 2.92deg x 2.92deg



The first one of the second-generation Chinese Antarctic Survey Telescope AST3-1 was installed at Dome A in January 2012.



Ogle-Tr-132 (Ra=162.6417, Dec=-61.9569)
Exposure: 60 seconds. A 5 arcmin x 5 arcmin area from 2.92 deg x 2.92 deg FOV. Taken on March 28, 2012

(2) 30m-50m Chinese Future Giant Telescope - CFGT

Aperture：30m

Primary Focus，f/1.2, FOV 20'

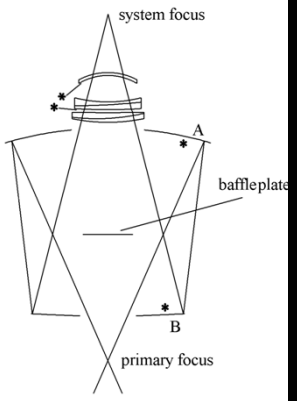
Nasmyth I（2），f/19

Nasmyth II（2），f/24

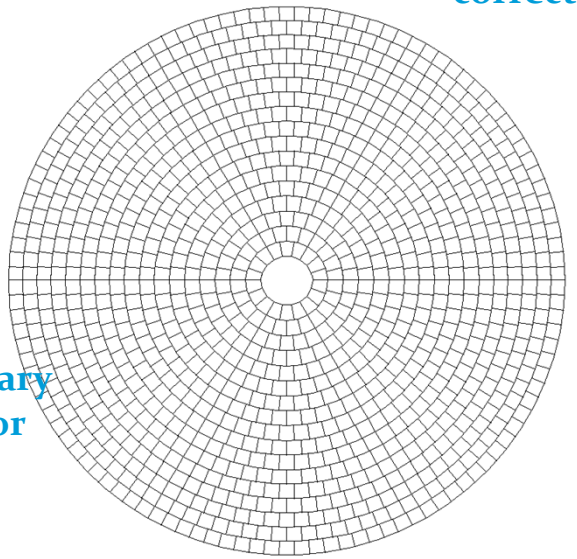
Cassegrain focus， f/14.6

Coude focus， f/200

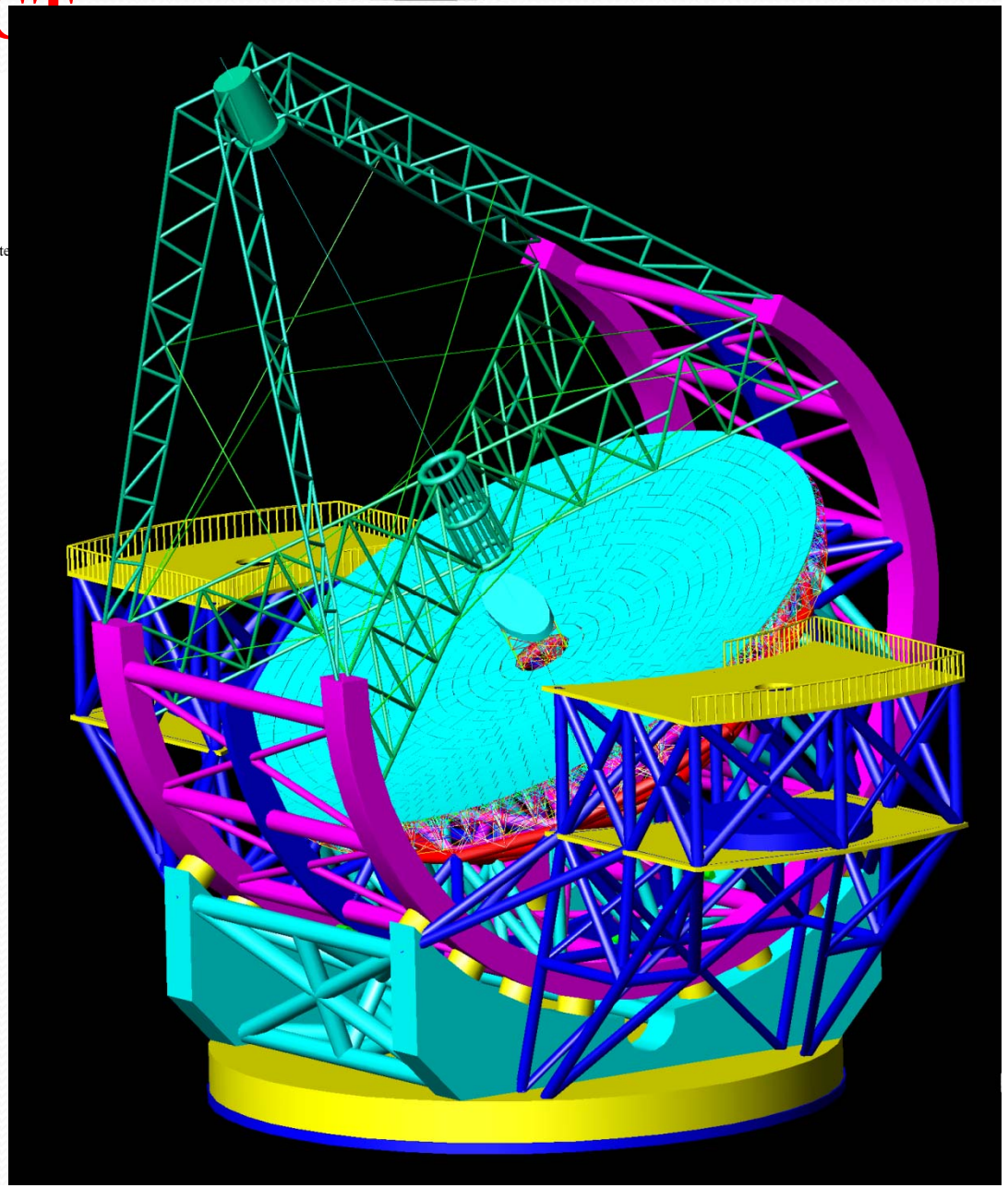
Diameter of Secondary: 2.476m



Primaru corrector



Primary mirror with 1122 segments



Na Wang

王 娜

- Professor
- Director of Xinjiang Obs./NAOC
- Laureate, New Century Talents Project, China
- Ten Outstanding Women Award, CAS
- **Research Interests**:

(1) Radio Astronomy, built the Nanshan 25m Radio Telescope System

(2) Pulsar monitoring and timing study

(3) 110m radio telescope project

25m Radio Telescope at Nanshan

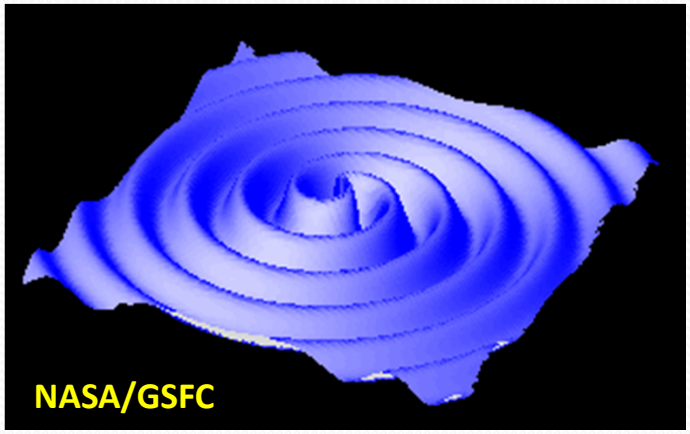
- Built in 1993
- Location: Tianshan Mountains, elevation 2080m.
- Equiped with L, C, S, X, K-band receivers.
- VLBI bankends: MK2 to MK5B, K5
- Pulsar & spectrum line backend: DFB
- Science: Pulsar, molecular spectrum, AGN, IDV

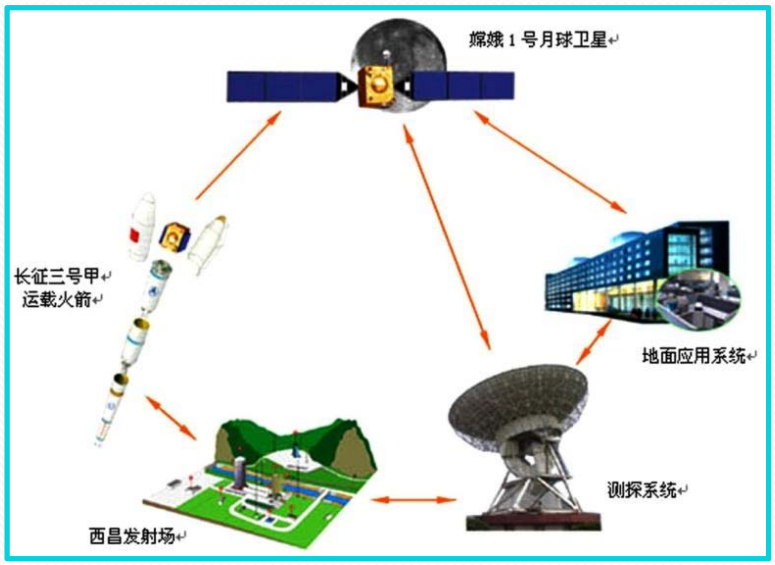
QTT science:

- Pulsar astronomy
- Molecular spectrum – star formation
- VLBI
- AGN, Dark matter
- Survey

Application:

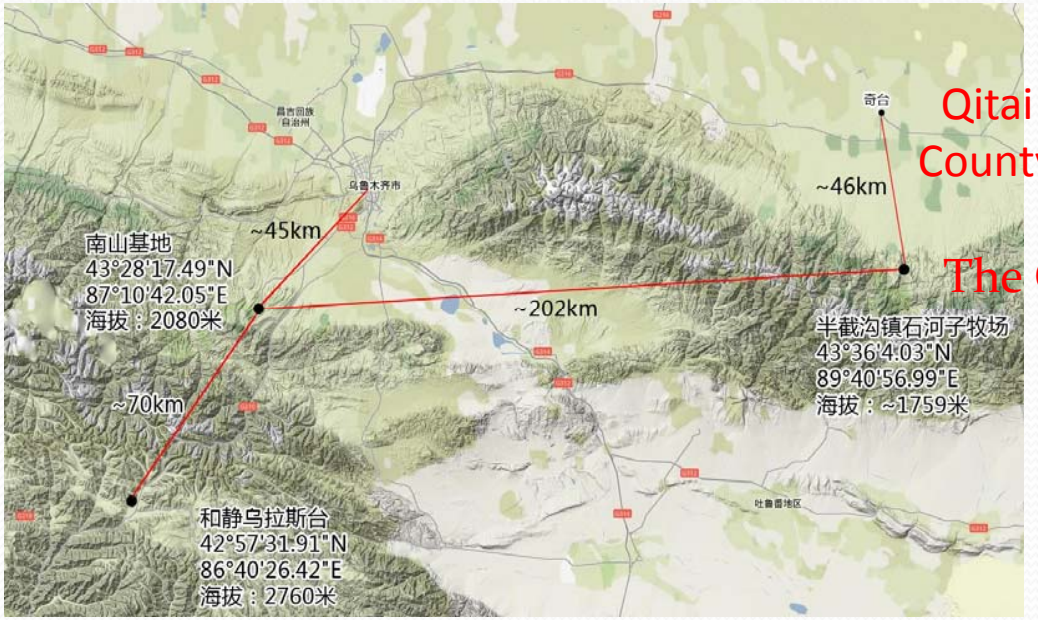
- deep-space exploration
- Lunar, mars, Venus
- Pulsar autonomous navigation
- Pulsar clock

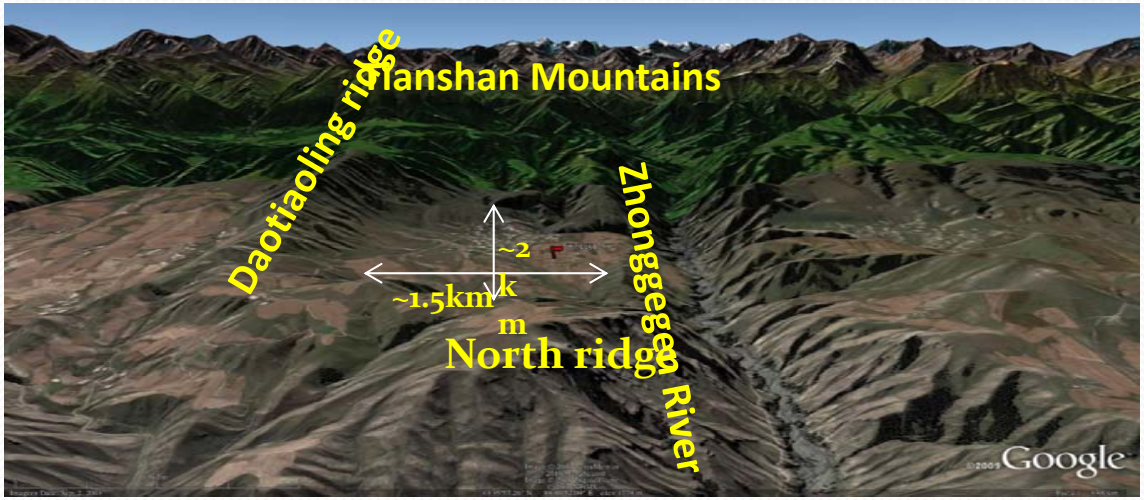




The site:

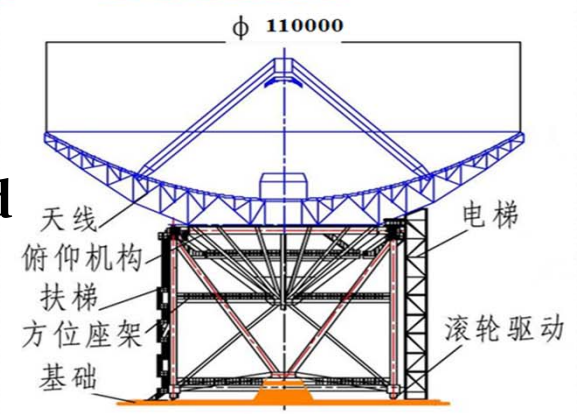
- 260km east Urumqi
- 202km from Nanshan 25m radio telescope
- ~1800m elevation
- North of Tianshan Mountain, 7 degree above horizon observable towards south





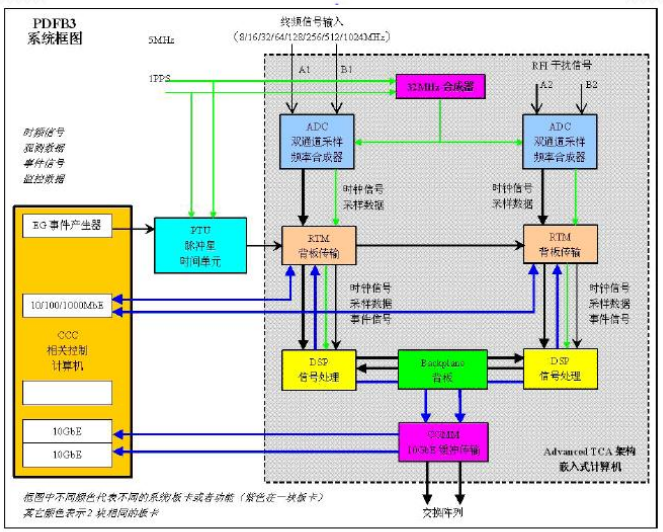
QTT: QiTai 110m radio Telescope

- Fully steerable
- Shaped Gregorian telescope paraboloid
- Active surface
- Aperture 110m
- Frequency range: 1m—3mm



Wide band digital receiver

- UHF: prime focus (feed forward)
- L～ W: secondary focus (feed back)



Backend / data sampling

- Pulsar / spectrum (DFB)
- Total power back end
- VLBI back end

Li Chen 陈黎
Prof.
Dept of Astronomy
Beijing Normal Univ.

- Ph.D., 1999, Beijing Normal University,
- thesis: Temporal Properties of Cyg X-1
- **Research**

(1)Computational Astronomy

(2)High energy Astrophysics

- **Award**

(1)prominent teacher of Beijing,1997

(2)Baosteel excellent teacher,2003

(3) Star teacher of Beijing,2012

Biwei JIANG 姜碧沩
Prof.
Dept of Astronomy
Beijing Normal Univ.

- **Research subjects** (> 60 papers, >400 citations):

(1)Circumstellar dust around AGB and post-AGB stars, in particular the 21 and 30 micron features

(2)Interstellar extinction law in infrared based on the 2MASS/Spitzer datasets

(3)Light variation of red stars such as red supergiants and red giants

Name: Shaolan Bi 毕少兰

***Current* Position:** Professor at the Department of Astronomy, Beijing Normal University, China

Scientific Activity

Helioseismology

- Solar modeling
- Rotation and magnetic fields
- Study of solar-cycle related changes in the Sun

Asteroseismology: Stellar Modeling and oscillations

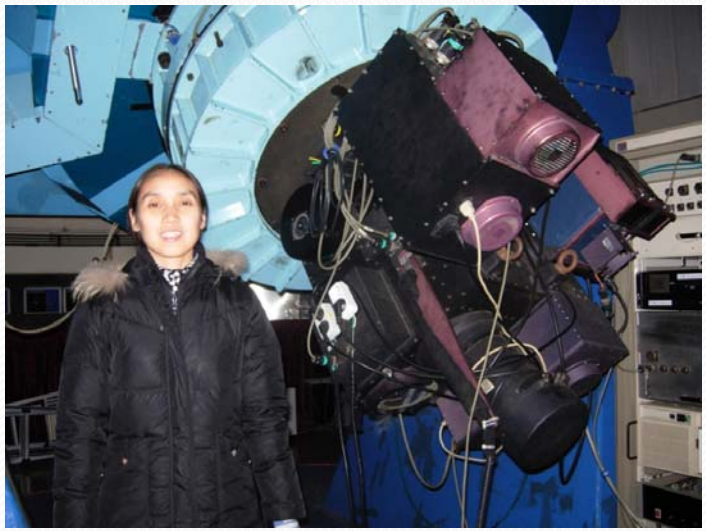
- Solar-type stars
- Red Giant stars

Yuqin Chen

陈玉琴

Prof.

NAOC



- *born in 1973 in Fujian, China*

- *graduated from Beijing Normal*
- *University and earned her PhD degree*
- *in 2000.*

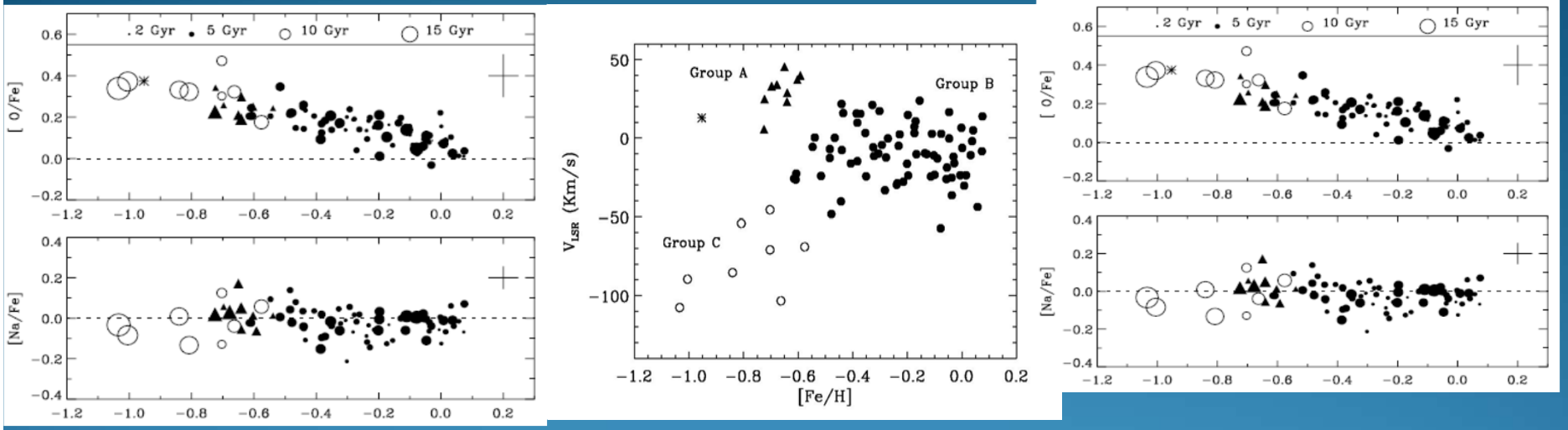
- visited the Institute of Physics and
- Astronomy of Aarhus University in 1998.

- *worked at National Astronomical*
- *Observatories, CAS became a professor*
- *in 2005 and a PhD supervisor in 2008.*

- *She has published 37 SCI papers with over 580 citations.*

- *She got the National Natural Science Award of China (second-class) being the second investigator in 2008 and*
- *won the 11th Science and Technology Award of China for the Youth in 2009.*

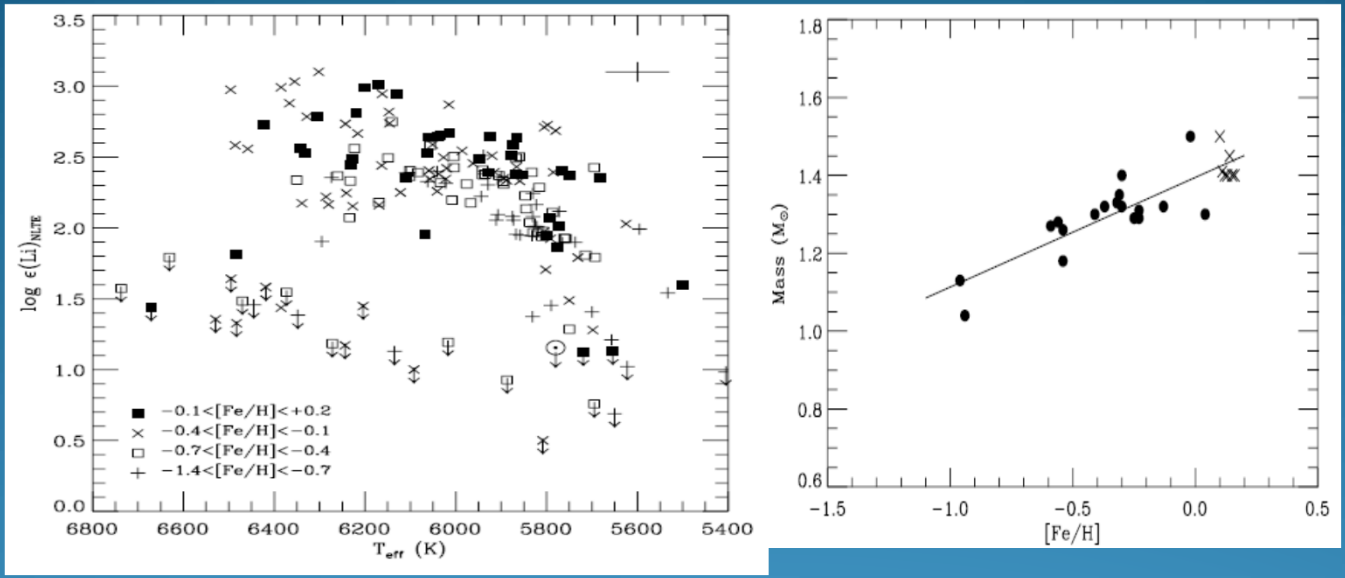
main contributions(1)



Left: Chemical abundances as functions of metallicity and age;
Right: Stars are grouping in the chemistry-kinematics diagram.

Using China’s largest 2.16-meter telescope, she has performed high resolution spectral observations and systematic quantitative analysis of the chemical compositions of a large sample of stars. By combining information from chemical abundances, kinematics and ages, these highly accurate results have also been widely applied in constructing Galactic chemical evolution models and and stellar nucleosynthesis theories.

main contributions(2)



Left: Li abundances as a function of temperature at different metallicity ranges; Right: The metallicity-mass relation detected for Li-dip stars in the field.

She systematically traced the evolution of lithium and established the relationship between lithium abundances and mass in field stars. These results provide important clues to the understanding of the depletion of lithium and are thought to be the most interesting relations found in recent years. This paper becomes one of the two papers in the study of Li-dip stars and has 60 citations.

Guanyi Ma

马冠一

Prof. NAOC

- Chief Scientist of Applied Astronomy Division in NAOC
- **Research Interests**:

  (1) Solar wind observation with Advanced Composition Explorer (ACE) satellite

  (2) Space weather forecast

  (3) South-East Asia Low-Latitude Ionosonde Network (SEALION).
- **Achievement**

(1) Organized a group to study mid- and low-latitude ionosphere

(2) Aimed to study the equatorial anomaly region in China, established a GPS receiver chain consisting of 4 dual frequency GPS receivers located at Fuzhou, Xiamen, Guangzhou and Nanning. This chain enables near real time monitoring of the low latitude ionosphere.

(3) Her continue efforts on ionospheric data analysis lead to discovery of a super equatorial bubble.

(4) ~40 research papers and ~10 patents.

Mei Zhang
张玫
Prof. NAOC

- Chief scientist of the Huairou Solar Observing Station of NAOC
- **Main scientific interests:**

(1) modeling the magneto-hydrodynamic processes in solar corona,

(2) understanding the fundamental underlying physics of solar coronal mass ejections (CMEs)

(3) measuring vector magnetic fields on the solar photosphere to constrain solar dynamo models.

- **Selected works and results since 2001 include:**

1） Pointed out that there is an upper bound on the total magnetic helicity of nonlinear force-free fields in the corona.

2) Discovered that the sunspot umbra and penumbra has opposite helicity signs and the usual hemispheric helicity sign rule exists in the global Sun in addition to active regions.

3) Pointed out that the magnetic flux ropes will be formed in the solar corona as a result of Taylor relaxation due to the magnetic helicity accumulation.

4) Provided a theory that unifies two independent observations of CMEs and solar prominences, namely that the fast CMEs are associated with normal prominences and slow CMEs are associated with inverse prominences.

5) Gave a theoretical picture of the evolution of the solar corona that unifies various observational phenomena.

- 40 SCI papers, cited more than 370 times, with one paper published on the “Annual Reviews of Astronomy and Astrophysics”

Yuehua

马月华

Prof.

Purple Mountain Obs.

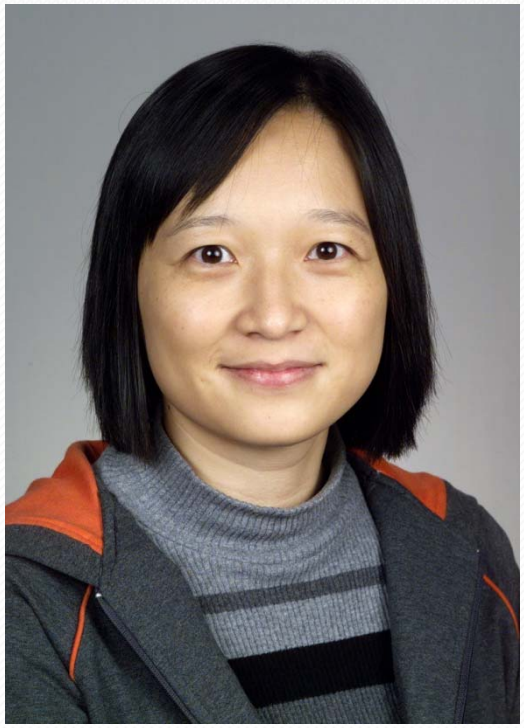
- Chief researcher in the group of NEO survey and minor bodies of the solar system in Purple Mountain Obs.
- **Research Interests**:

  Planetary Science, formation & evolution of meteoroid stream, physical Properties of comets and asteroid.
- Since 1985, she has been engaged in astrophysics and solar system bodies research. and has got some remarkable achievements in plasma astrophysics, planetary physics, formation & evolution of meteoroid stream. Her research works involve self-generated magnetic field in celestial bodies, the magnetic field structures of corona, propagation of the solar wind in solar-terrestrial space, comet SL-9 impact on Jupiter, the structures of the Saturnian ring, the ejection velocity of comet, meteoroid streams, and so on.

Lei Hao 郝蕾

Prof.

Shanghai Obs.



- Received PhD in Astronomy from Princeton University in 2004, then worked as a research associate at Cornell University from 2004 to 2008, and the University of Texas at Austin from 2008 to 2009. Working at Shanghai Obs. since 2009.

- **Main research interests:**
  Formation and evolution of normal or active galaxies.

- Published over 40 refereed papers in various international journals, which have been cited by others for over 2000 times. Her first-author papers have been cited by others for over 350 times, including a prestigious international Astronomy textbook and several ARAA (Annual Review of Astronomy of Astrophysics) review papers.
- A key member in many international astronomical collaborations, including the influential Sloan Digital Sky Survey, the Spitzer Space Telescope instrumentation team, and the HET Dark Energy Experiment.
- PI of an NSFC General Program, and the PI of a Shanghai Pujiang Talent program. She is also a co-I of the 973 Project titled “Studies of Black Holes and Other Compact Objects”.
- In addition, she is the PI of the “China Lijiang IFU” project involving over 10 institutes, which proposes to build an IFU instrument for the 2.4-meter telescope in Lijiang, Yunnan Province.

Tiexin Liu 刘铁新

Prof.

Shanghai Obs.

- She received doctor degree on Astronomy at 2002 in Shanghai Astronomical Observatory (SHAO), CAS
- Working at time and frequency division of SHAO after graduation.
- Research field: miniature hydrogen maser.
- She has been also responsible for three projects of National Natural Science Foundation of China as following:

(1) Youth project about the electronic design of the passive miniature hydrogen maser

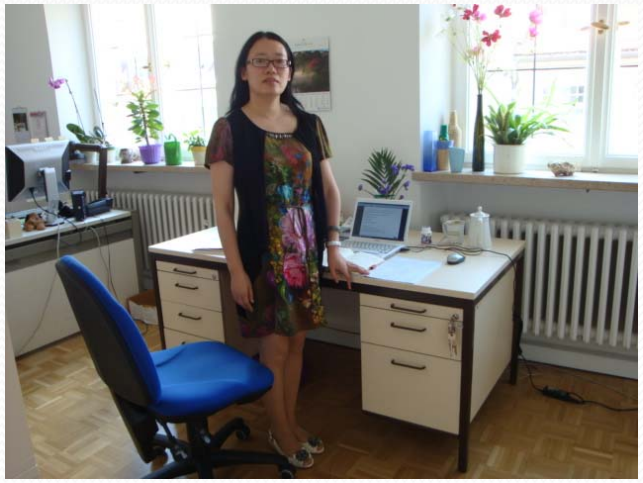
(2) Key project about key technologies of passive miniature hydrogen maser.

(3) A project about long term frequency stability of passive miniature hydrogen maser.

Xiaoya Wang 王小亚

Prof.

Shanghai Obs.



- Ph.D. degree in Astro-Geodynamics from Chinese Academy of Sciences in 2001.
- Her main fields :space-geodesy data processing, analysis and their applications.
- She even worked on Compiling global Astrolabe Catalogue for 3 years at Shaanxi Astronomical Observatory, GPS Meteorology for 2 years at the Hong Kong Polytechnic University and the determination of EOP and TRF for 6 months at DGFI in Germany.
- She carried out the first Chinese GPS meteorological experiments and obtained important achievements in the precision orbit determination of space aircrafts, GPS Meteorology, plate motion, crustal deformation, crustal vertical motion, ionosphere monitoring and so on.
- She was the Principal Investigator(PI) of 7 projects
- She was also the Co-Investigator and Participant of over 10 research projects such as the National 863 project of China “Short period aviation weather forecast technique based on GNSS”, the National Important Special Projects of China “Data Processing of Satellite Navigation System”, National Climbing project “Investigation on Present-day Crustal Motion and Geodynamics in China” and so on. She has been also responsible for ILRS SHAO ACC since 2007 and the establishment of China Earth Orientation Parameters Service System since 2011.

Xiaochun Lu 卢晓春

Prof.

National Time Service Center

- Vice director of International Cooperation Research Center, China Satellite Navigation Office.
- Her research interests mainly include key techniques of satellite navigation, quality monitoring and evaluation of navigation satellite signals, signal compatibility and interoperability of GNSS, and time synchronization, etc.
- She proposed a time synchronization method of CAPS transmitted signals, and a method of CAPS satellite timing, and designed the CAPS satellite signals
- Since 2007, she devoted in the research of seamlessly integrated navigation and positioning technology, and proposed a high-precision seamlessly integrated navigation and positioning technology in urban environment based on satellite positioning system, digital TV positioning, UWB indoor positioning and cell phone positioning. She for the first time developed the Quality Evaluation System of navigation satellite signals in China. She has led and participated in several research projects of 863, CAS Knowledge Innovation Projects, National Science Foundation, and 973. She has published more than 30 academic papers in domestic and foreign important periodicals and meetings, has 2 Invention Patents and 1 Utility Patent.

Li Ji 纪丽

Prof.

Purple Mountain Obs.

- She got a Ph.D degree in 2006 from the astronomy department of the Massachusetts University at Amherst. She moved to MIT Kavli Institution for her first postdoc position. She stayed there for almost four years with Chandra HETGs group. Then she joined CfA high energy group as a visiting scientist for about a year. Finally, at 2011, she settled down in Purple Mountain Observatory (PMO) as a research faculty of Hundred Talented People program of CAS in China.

- Li, is an expert in the field of non-equilbrium ionization coding and applications in X-ray astrophysics. She is now one of major members of X-ray atomic database ATOMDB in USA. She works in the different fields in X-ray astronomy, from the small scale, such as X-ray binaries, star cluster winds, and SgrA*, to the larger scale, such as SNRs, warm absorbers in AGNs, and outer region of cluster of galaxies. She is most interested in the diffuse plasmas which is in the non-equilibrium ionization state. She once won the archive and theory proposals of Chandra as a PI. Now she is the Co-I of the large visional X-ray program (XVP) of Chandra since 2011 for the 3Ms observations of SgrA*. She is the key member who is working on the diffuse emissions in and surrounding of SgrA*.

-

- Li, has established her high energy astrophysics group in PMO, including 3 postdocs and 3 graduate students. She is also the scientist, who is responsible for the scientific database and platform of Dark Matter Detector, a funded large project in CAS.

Xuefei Chen 陈雪飞

Prof.

Yunnan Obs./NAOC

- She mainly studies **binary evolution and related objects.**
- She gave some basic relations and criteria for the evolution of single stars and binaries, which are decisive for determining the evolutionary paths and destinies of stars (including binaries).

  Xuefei also studied the binary origin for blue stragglers, which extend their lives by stealing mass from their nearby companions, and firstly presented their contribution to the integral spectral energy distribution of host clusters theoretically.

  Type Ia supernovae have been used to determine cosmological parameters and provide the most direct evidence for the existence of dark energy. However, their progenitors remain unknown and this hampers their use for precision cosmology. Currently there are two competing models i.e. single-degenerate (SD) and double-degenerate (DD) models. In the DD scenario, two carbon-oxygen (CO) white dwarfs (WDs) can produce an SN Ia while merging if their total mass is larger than the Chandrasekhar mass limit. In the SD scenario, a CO WD explodes as an SN Ia if its mass reaches Chandrasekhar mass limit while accreting from a non-degenerate companion. The DD model can produce the observational number of SNe Ia while the SD model can only produce about 1/3 of that under optimal conditions. In the framework of the SD model, Xuefei proposed a tidally enhanced stellar wind model, which extensively enlarges the birthrate of SNe Ia in this way. As well, she lowered the birthrate from the DD scenario by an order of magnitude by considering some constraints on the lower mass limit.

Present situation in China

- Girls into primary school has reached 99% (in 2005)
- College students in the number of girls accounted for 49.85% (2008 census)
- Women with scientific research personnel accounting for about 37% of the number of the scientific research
- Women apply for youth fund age relax to 40 in NSFC
- Even the feudal residual influence still exist in China, but present situation shows more better environment for women in education, and getting into scientific fields.