

## Bo Zhao

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### Summary

I have been working as an optical scientist at the Instrument Service Center of Astronomy Department in University of Florida more than a decade. We have developed many cutting edge optical and infrared instruments for astronomical society. Optical design and engineering are my main duties that include optical system design, trade-off study, optical simulation, sensitivity and tolerancing, stray light analysis, and instrument alignment and commissioning.

### Tools & Skills

- Zemax/proficient in using both sequential and non-sequential ray tracing modes to do lens design, modeling, tolerancing, and stray light and thermal analysis
- Gsolver/diffraction grating modeling and efficiency analysis
- Matlab/optical simulation and image analysis
- Microsoft Office/good use of Word, PowerPoint, and Excel
- Solidworks/basic parts design and assembly
- Self-motivated on new knowledge and multiple tasks
- Good communication with colleague and vendors
- Trouble shooting and hands on lab setup an experiment
- Supervising graduate students, supporting proposals, and project lab management

### Education

- ❖ Ph.D./Optical Engineering/Chinese Academy of Sciences
- ❖ M.S./Optical Instrumentation/Chinese Academy of Sciences
- ❖ B.S./Optical Engineering/Changchun Institute of Optics and Fine Mechanics, China

### Working Experiences

- ❖ 2016.7-present/Associate Scientist/Astronomy Department of University of Florida
- ❖ 2008.1-2016.6/Assistant Scientist /Astronomy Department of University of Florida
- ❖ 2004-2007/Postdoctoral Research Associate/Astronomy Department of University of Florida
- ❖ 2000-2003/Optical Scientist/National Astronomical Observatories Center, CAS, China

### Projects (As optical designer)

#### 1) Compact instruments

- IMPS/Integrated Miniature Polarimeter and Spectrograph has no moving parts and works at the visible wavelength band and can capture all I, Q, U, V polarization simultaneously. (2014-present)
- Mini Raman Spectrometer/Raman spectrometer (100mm x 30mm x 20mm) works at 785nm-1050nm by using lenses and VPH grism. (2013-2013)
- Fiber Mode Scrambler/Optical near and far field exchange to stabilize the PSF. (2009-2012)
- Image Slicer/Slicing image into small pieces by using mirrors to increase resolution. (2012-2013)

#### 2) Astronomical Instruments

- DAG/Proposal for near infrared adaptive optics imaging camera (2017-2018)
- ISIM/Integrated Standard Imaging Module made of innovative designed Makustov-Cassegrain

telescopes to provide diffraction-limited imaging quality within large field of view. Developed the alignment method and procedure.(2013-2018)

- MIRRADAS/Near infrared multi-object spectrograph. Performed the stray light analysis and directed the baffles design.(2014-2015)
- ILocator (prototype)/Ultra-precision near infrared exoplanet finding spectrometer. Analyzes the Gaussian beam transfer property by using POP function in Zemax to simulate the system imaging performance. (2013-2014)
- FIRST/Florida infrared silicon immersion grating spectrometer. Also performed the thermal analysis for the opto-mechanical design. (2012-2014)
- EXPERT-III/an update version extremely high precision extrasolar planet tracker. Designed apochromatic lenses by using Calcium Fluorite and i-Line glasses improved the throughput. Increased wavelength coverage by using double prisms that create anamorphic format on CCD. Also developed fiber mode scrambler which stabilizes the PSF of the system and increases the radial velocity measurement precision.(2009-2013)
- LiJET/Lijiang observatory extrasolar planet tracker uses fixed delay Michelson interferometer to boost spectral resolution with low cost. (2007-2009)
- EXPERT/Designed double-pass camera for extremely high precision extrasolar planet tracker. (2006-2008)
- MARVELS/Multi-object APO Radial Velocity Exoplanet Large-area Survey. Also designed Michelson interferometer double beam output folding system and improved throughput. Performed stray light analysis to reducing the VPH spectrograph ghost problem. Increased the observation efficiency 30 times. I was rewarded "the Architect of MARVELS" as many exoplanets and brown dwarfs discovered by using this instrument. (2007-2011)
- SIG/Silicon Immersion Grating can provide more than 3 times dispersion than standard grating
- SMFB/single mode fiber bundle for high contrast imaging filters.(2005-2007)
- SAI/Synthesis Aperture Imaging. (2003-2004)

### **Patents & Publication**

- ❖ "Integrated Miniature Polarimeter and Spectrograph Using Static Optics", US 62/153,720
- ❖ "Telescope and Telescope Array for Using in Spacecraft", PCT/US2015/021996
- ❖ "A Compact Wide-field Binocular Imager for Spacecraft Remote Sensing at Simultaneous Visible and NIR Wavelengths", US 14/224,134
- ❖ "Small Spectrometer with High Stable Precision", CHN 96220761.6
- ❖ 26 refereed papers, and 25 non-refereed papers (SPIE)

### **Reward & Memberships**

- ❖ I was awarded "the Architect of MARVELS" by SDSS-III in September 22, 2010
- ❖ Member of SPIE #522147