

# Light Pollution and Protecting Astronomical Sites in China

**Richard F. Green**

933 N. Cherry, Tucson, AZ, USA  
email: [rgreen@lbto.org](mailto:rgreen@lbto.org)

**Abstract.** Prof. Baozhou Zhang hosted a meeting of IAU Commission 50 members with Chinese academics and lighting professionals at Beijing Normal University.

**Keywords.** Site protection, Light pollution, Outdoor lighting

---

## Participants were

Xiaju Chen	National Institute of Metrology
Yongqiang Yao	National Astronomical Observatories, Chinese Academy of Sciences
Tao Luo	China Academy of Building Research
Shuxiao Wang	China Academy of Building Research
Yuan Li	China Academy of Building Research
Jia Liu	Tsinghua University
Xumei Zhang	Tsinghua University
Gang Liu	Tianjin University
Ligen Lu	Beijing Normal University
Baozhou Zhang	Beijing Normal University
Chris Luginbuhl	US Naval Observatory
Ramotholo Sefako	South African Astronomical Observatory
Richard Green	Large Binocular Telescope Observatory

City lighting planners are charged with reducing light pollution, but it isn't easy. Luminaires don't always have photometrics for directions above horizontal. Sometimes manufacturers will respond. When the planners have some control, they can get contractors to comply, at the level of line managers and installers, but they can't control others' projects. There is concern about energy efficiency of full shielding. In China, they observe CIE guides of 1%, 4% uplight, etc. and find it difficult to illuminate roadways uniformly with full cutoff. They have 2 candela/m<sup>2</sup> protocol for major arteries; 0.75 for feeder streets.

Results are measured through night sky brightness meters and calibration of satellite data. Lu calibrates their measurements of sky brightness around Beijing out to Xinglong Station with a standard lamp every 3 months. Luginbuhl calibrates his CCD images with well sampled stars in a panoramic image with 45 images stitched together. Wang has a technique to measure roadway luminance with a 35-mm lens and CCD.

Narrow-band amber LED is best for spectral protection around observatories. Mixing yellow and 10% white LEDs in a common luminaire can provide color rendition. The white light can be shut off at some point during the night. Color rendition is needed outdoors primarily for pedestrian areas with commerce; it is most important for interior lighting. The preference is for warmer color (lower CCT) in white light rather than cooler.

To protect observatory sites in China, the first step is for astronomers to work with local governments to convince them of the importance of night sky protection. The nighttime brightness of a city is perceived to reflect its economic importance.