

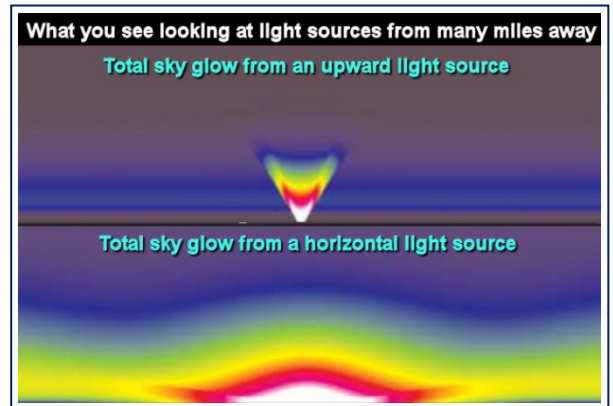
# ARIZONA ASTRONOMY, PLANETARY, AND SPACE SCIENCES

## HB 2757: FACT CHECK

→ CLAIM: “Sky glow results when light fixtures emit light upward into the night sky...” [YESCO Electronics memo re HB 2757]

### **PARTLY TRUE**

Sky glow also results from horizontal or near-horizontal light sources, and horizontal or near-horizontal light contributes far more to total sky glow at large distances from the source than upward directed light (see figure at right adapted from a peer-reviewed paper by Christian Luginbuhl of Flagstaff, published in 2009 in *Physics Today*, the official journal of the American Institute of Physics).



→ CLAIM: Dr. Ian Lewin and the billboard industry say that digital billboards “would actually reduce sky glow rather than increase it” if they are used to replace conventional signs.

### **FALSE**

A digital billboard may create less sky glow directly above it than an upward light but **will increase sky glow overall and at distances far from the billboard**, since its light streams outward, crossing city and county boundaries.

→ CLAIM: Digital billboards can be filtered to remove blue light and remove any threat to observatories and dark skies.

### **FALSE**

Ground-based telescopes observe all colors of visible light as well as light invisible to the human eye (in the ultraviolet and infrared); **filters do not protect dark skies and telescopic observations**.

→ CLAIM: Local controls are adequate to regulate digital billboard light.

### **FALSE**

Local ordinances are crucial but State-level control is also vital to (1) efficiently control proliferation of brilliant digital billboard light from remote jurisdictions and (2) show to investors proposing clean, high-tech, nine-figure projects that Arizona is committed to preserving their essential resource.

→ CLAIM: Digital billboards are fainter than conventional, uplit, reflected-light billboards.

### **PARTLY TRUE**

They can be controlled to reasonable and readable levels at night, but they can be extraordinarily brighter if brightness limits are not set. Dr. Ian Lewin agrees: “*Lighting Sciences Inc. of Scottsdale, Arizona, a well-known research and testing facility...has advised a maximum brightness setting of 300 nits.*” [Lewin, 2012, memo re HB 2757]

→ CLAIM: Astronomers’ opinions are not scientific and are not based on fact [Lewin, 2012, memo re HB 2757].

### **FALSE**

Astronomy is the study of light; you cannot put a star in a test tube and poke it. All astronomical research is founded on a deep understanding of the properties and nature of light. Our conclusions are entirely fact-based and reproducible, based on decades of study and experience, and are not opinion. Our conclusions on the harmful nature of HB 2757 to astronomical research in Arizona are based on the evaluations of every observatory director in Arizona, optical engineers, and Navy Captains who are charged with protecting the nation's essential GPS capabilities, rather than relying on a single study commissioned by an interested party. HB 2757 should be amended as recommended by the observatories, and if not so amended, defeated.