

**YALE UNIVERSITY**  
**Department of Astronomy**  
**Colloquium**

**“Ground-based High Resolution  
Measurements of Solar Diameter”**

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**ABSTRACT:** I will compare four classical methods of solar diameter measurement: 1. eclipses 2. planetary transits 3. meridian and almucantar transits 4. heliometers. The first three methods are based on precise contact timings between the solar limb with 1. the irregular lunar limb features (Baily's beads) 2. Venus or Mercury limbs 3. the meridian (or an hourly circle) or an equal altitude circle; 4. the angular distance between the solar edges is directly measured. Through Baily's beads light curve the Limb Darkening Function LDF has been recovered, using the Kaguya profile of the lunar valleys. After the steepest descent the LDF shows a tail due to the Flash Spectrum Region FSR, produced by emission lines and visible only during total eclipses. I will discuss how FSR and inner corona can affect naked eye timings, when dealing with historical eclipses. Instrumental effects are discussed when dealing with historical meridian and planetary transit observations. Recent transit data obtained at the 45 cm Gregory-Coude' solar telescope of IRSOL (Locarno, Switzerland) are presented to evaluate low-frequency atmospheric effects on the diameter's measurements.

