

## ***"Solar Outer Shape distortions and Luminosity variations"***

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Models related to solar surface magnetism respond to about 95% of reconstruction and the remaining may originate from non-magnetic effects. Sofia & Li (2000) have suggested that the activity cycle modulation of irradiance is primarily produced by a luminosity variation (both in terms of changes in radius,  $dR$ , and effective surface temperature,  $dT$ ). Taking into account the ellipticity of the solar shape and from the computed best fit of modeled to observed irradiance, we show in this paper, that  $dT$  must be no more than 1.2 K if combined with a radius variation amplitude  $dR = 10$  mas. Moreover, we show that the amplitude of solar irradiance modulation is very sensitive to small photospheric temperature variations. We underlined a phase-shift (correlated or anticorrelated radius and luminosity variations) in the  $[dR, dT]$ -parameter plane. From gravitational energy considerations, we obtain an upper limit on the amplitude of cyclic solar radius variations between 2.2 and 2.5 km. To understand the origin of the irradiance modulation, the asphericity-luminosity parameter  $w$  is computed. We find  $w \approx -3.7 \times 10^{-3}$ . Such a small (negative) value indicates that solar surface phenomena play a major role in producing the solar luminosity.