Spherical and Expanding Model Atmosphere Predictions for Interferometry

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Direct interferometric measurement of stellar limb-darkening, unambiguously revealed by the shape of the visibility curve a beyond the first null, is presently available for a only a few stars. The vast majority of present day stellar diameter measurements require a theoretical limb-darkening correction to recover the "true" diameter and to interpret multi-wavelength uniform disk results. Compilations of theoretical, wavelength dependent, center-to-limb intensity profiles needed for such corrections are almost exclusively derived from plane-parallel model atmospheres and are therefore generally inappropriate for modeling the atmospheres of giant and supergiant stars. In our theoretical studies of the angular sizes of both hot and cool supergiant stars with the general-purpose stellar atmosphere code `PHOENIX`, we have found significant and testable differences between spherical and plane-parallel model predictions. We show examples of these differences in our studies of 1) the interferometric diameter of the A-type supergiant α Cygni and 2) interferometric diameter ratios at wavelengths inside and adjacent to the 712 nm TiO band for normal M-type giants and supergiants.