

Lab 9

Andry Paez

Riess et al. 1998 High-redshift SNe Ia are observed to be dimmer than expected in an empty universe (i.e., $\Omega M = 0$) with no cosmological constant. A cosmological explanation for this observation is that a positive vacuum energy density accelerates the expansion. Mass density in the universe exacerbates this problem, requiring even more vacuum energy. For a universe with $\Omega M = 0.2$, the MLCS and template-fitting distances to the well-observed SNe are 0.25 and 0.28 mag farther on average than the prediction from $\Omega \Lambda = 0$. The average MLCS and template-fitting distances are still 0.18 and 0.23 mag farther than required for a 68.3% consistency for a universe with $\Omega M = 0.2$ and without a cosmological constant.