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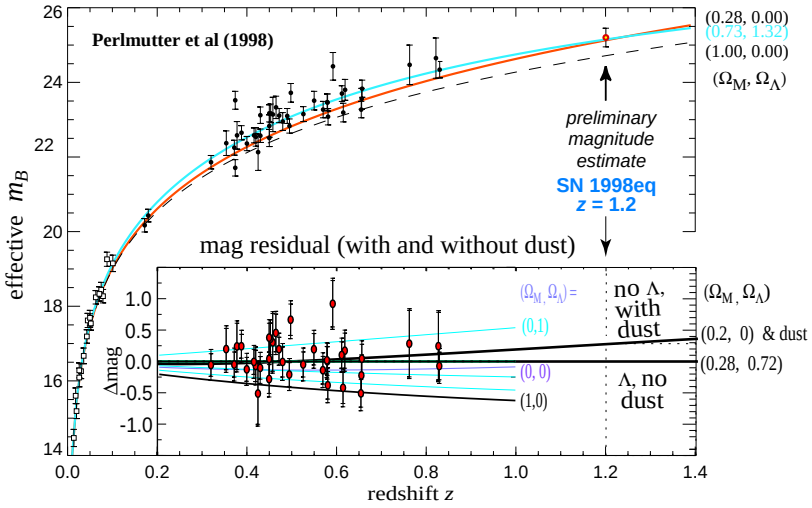

Figure 1: Hubble diagram for 42 high-z SNe (Perlmutter *et al.* 1999). The best-fit world model with $(\Omega_M, \Omega_\Lambda) = (0.73, 1.32)$ is drawn through the data (grey line). The Einstein-de Sitter case (1.0, 0.0) is strongly excluded by the current data (dashed line). The case $(\Omega_M, \Omega_\Lambda) = (0.28, 0.00)$ indicates that some contribution from a cosmological constant is required for values of Ω_M favored by dynamical measurements. The magnitude difference between the best-fit world model and suitable ones with Ω_Λ=0 show redshift dependencies which would be very hard to mimic with SNe evolution or gray dust (see inset panel). By extending our survey to $z > 1$, the *shape* of the curve alone would become sufficient evidence to support a cosmological constant. The preliminary magnitude estimate of our highest redshift SN 1998eq at $z = 1.2$ is suggestive, but more analysis and more SNe at this redshift are necessary.

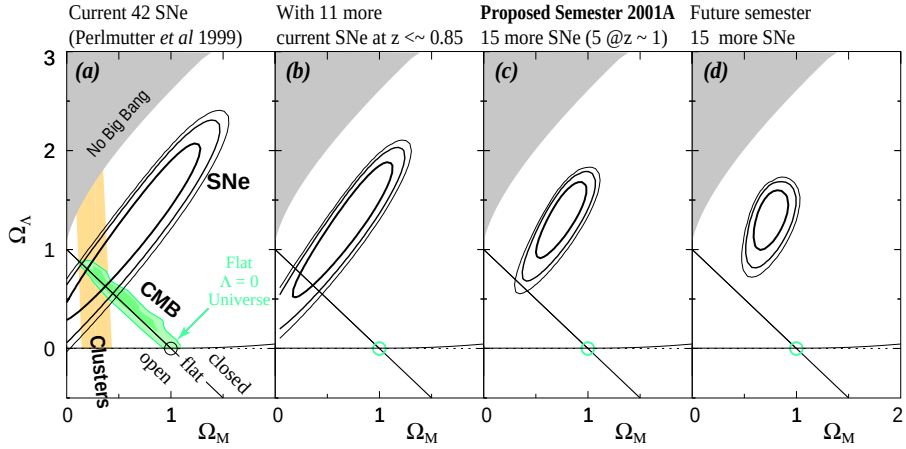

Figure 2: *(a)* 68%, 90%, and 99% confidence regions in the Ω_M—Ω_Λ plane from the 42 distant SNe Ia in Perlmutter *et al.* 1999. These results indicate $\Omega_\Lambda > 0$, in agreement with the overlap of the recent combined CMB results (Jaffe *et al.* 2000) with the Ω_M measurements from galaxy clusters. *(b)* Expected confidence region after including our additional 11 $z < 0.85$ SNe Ia currently under analysis. *(c)* Confidence region expected from the observations requested in this proposal, including two at $z \sim 1.2$. *(d)* Future confidence region after another similar semester. These simulations show that our proposed program can check the curvature of the universe found by the CMB program; we dramatize the point by showing a scenario in which the universe is *not* flat, e.g., using the central Ω_m,Ω_Λ value of panel *(a)*.