IWARA
From Quarks to Cosmos

Kinematic Constraints on Spatial Curvature

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Problem

- In this work three parameterizations were proposed to $H(z)$, $D_C(z)$ and $q(z)$, where each one is an expansion on redshift z parameter. This approach allows to reconstruct the evolution of the Universe without considering dynamics.
- The parameterizations are done by:

$$D_C = z + d_2 z + d_3 z^3; \tag{1}$$

$$\frac{H(z)}{H_0} = 1 + h_1 z + h_2 z^2; \tag{2}$$

$$q(z) = q_0 + q_1 z. \tag{3}$$

- Where: d_2, d_3, h_1, h_2, q_0 and q_1 are the polynomials parameters of expansion.

Outcomes

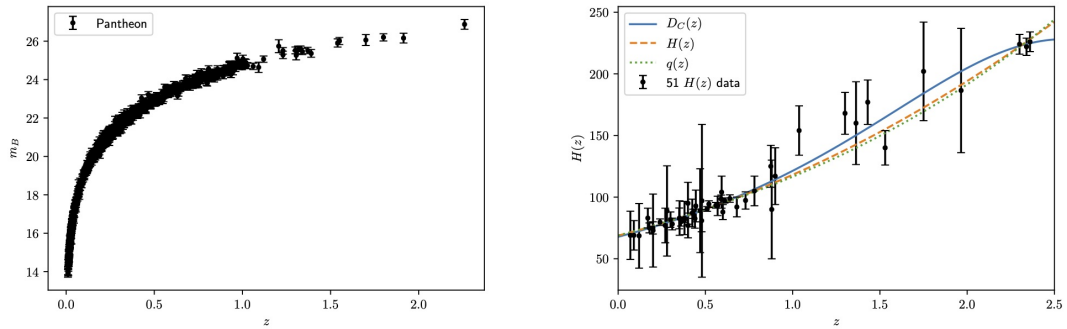

Figure 1: **a)** SNe Ia apparent magnitude m_B from Pantheon. The error bars shown correspond only to statistical errors, but we use the full covariance matrix (statistical+systematic errors) in the analysis. **b)** 51 $H(z)$ data compilation. The lines represent the best fit from SNe+$H(z)$ data for each model.

The table shows results from parameterization

Treatments	**Response 1**	**Response 2**
Parameter	$D_C(z)$	$q(z)$
H_0	$69.0 \pm 2.4 \pm 4.9$	$69.3 \pm 2.4^{+4.8}_{-4.7}$
Ω_k	$-0.03^{+0.24+0.56}_{-0.30-0.53}$	$-0.08^{+0.21+0.54}_{-0.27-0.45}$
d_2	$-0.255 \pm 0.030^{+0.059}_{-0.061}$	–
d_3	$0.029 \pm 0.011^{+0.023}_{-0.022}$	–
q_0	–	$-0.536 \pm 0.085 \pm 0.17$
q_1	–	$0.73 \pm 0.15 \pm 0.30$

Table 2: Constraints from Pantheon+$H(z)$ for $D_C(z)$ and $q(z)$ parametrizations. The central values correspond to the mean and the 1 σ and 2 σ c.l. correspond to the minimal 68.3% and 95.4% confidence intervals.

As outcomes obtained for the spatial curvature were:
$\Omega_k = 0.11^{+0.21}_{-0.24}$, $-0.05^{+0.21}_{-0.24}$ and $-0.03^{+0.21}_{-0.24}$.