The shape of the universe and cosmological parameters estimation.

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IUF

Successes of Inflation

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"The results of Eqs. (68a) and (68b) suggest that our Universe is spatially flat to an accuracy of better than a percent."

This does not result from a pure geometrical test on our 3D space.

Basics of cosmology

Robertson-Walker metric

$$ds^2 = -c^2dt^2 + a(t)^2[r^2(d\theta^2 + \sin^2\theta d\phi^2) + \frac{dr^2}{1-kr^2}]$$

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and :

General Mattig relation

$$r = S_k\left(\int_{t_S}^{t_0} \frac{cdt}{a(t)}\right)$$

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Newtonian dynamic:

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(see Mukhanov's book)

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General Relativity

$$K = kc^2$$

so

$$\Omega_k = 1 - \sum \Omega_{contents}$$

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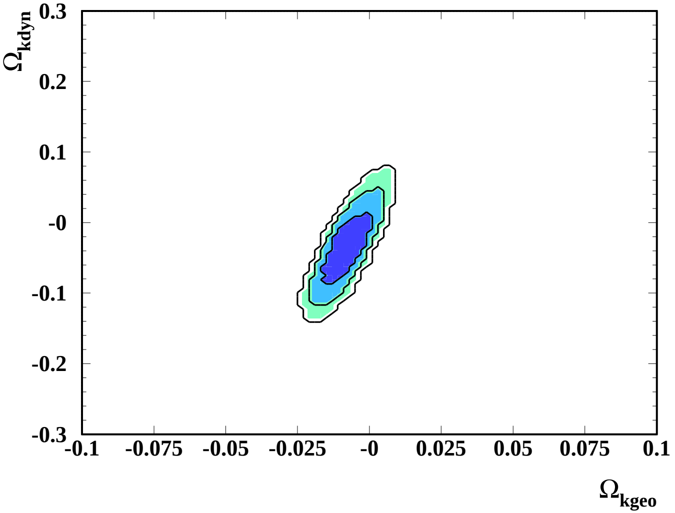
and use SNIa, CMB, BAO to constrain these quantities.

With $w = -1$



Ω_{kdyn}
0.3
0.2
0.1
-0
-0.1
-0.2
-0.3
-0.1
-0.075
-0.05
-0.025
-0
0.025
0.05
0.075
0.1
Ω_{kgeo}

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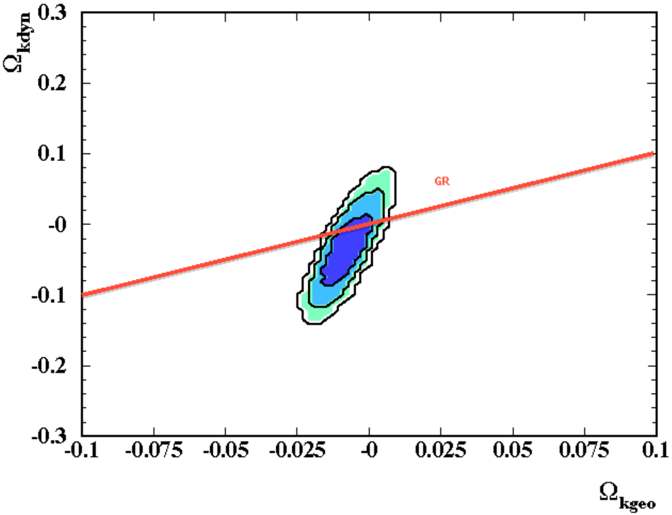

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0.025
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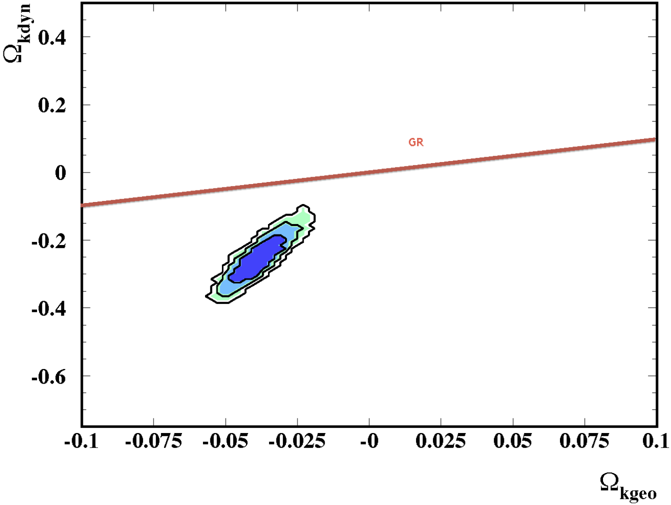
0.075
0.1
Ω_{kgeo}

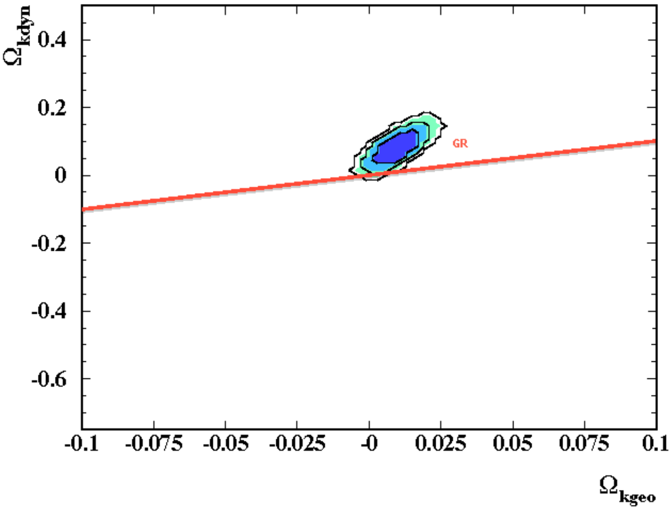
With different equation of state

w = -0.8



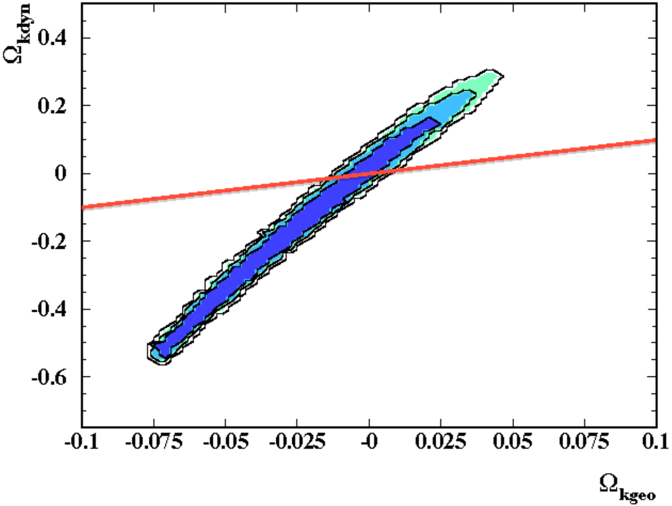
With different equation of state

w = -1.2



With different equation of state

w = marginalized



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Thank You