

# Constraining cosmological parameters using cosmic voids

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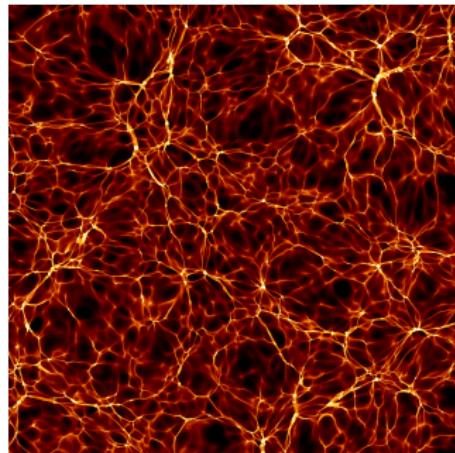
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# Cosmic voids

Cosmic voids are geometrically approximated to an ellipsoid characterizable by its **ellipticity** and **prolateness**. [1]

Since ellipticity variations are sensitive to the cosmology used to generate the temporal evolution of the system, in particular to dark energy, these characteristics allow us to constrain cosmological parameters. [2]

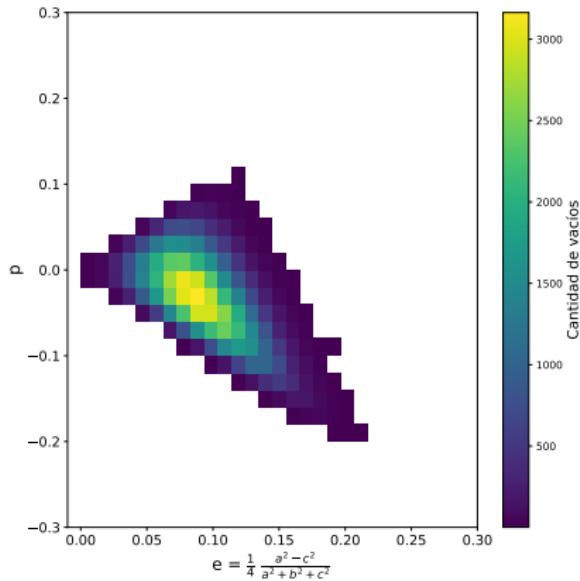
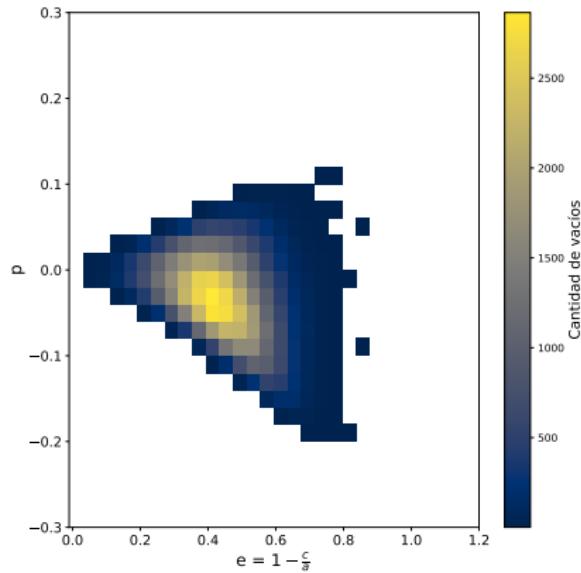


**Figura:** A slice through an Abacus simulation box at  $z=1.0$ . [3]

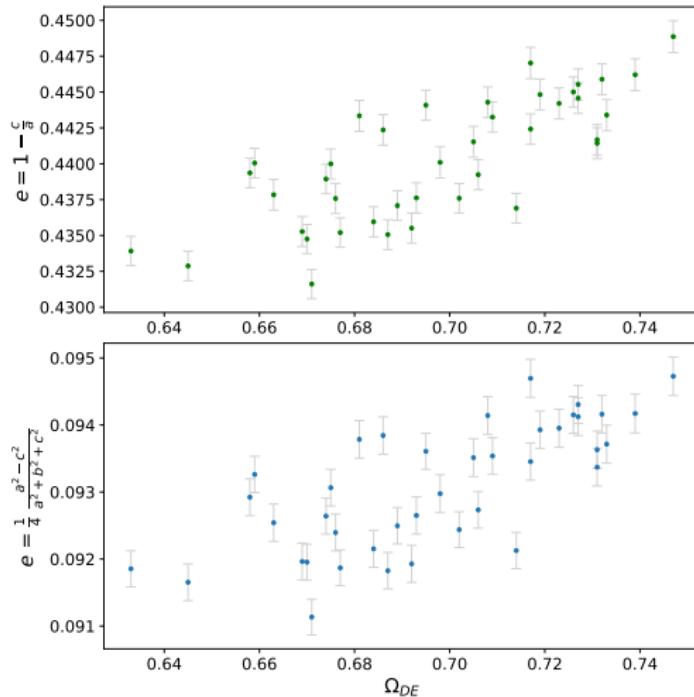
# Void Finder

The operation of the Void Finder is based on the property of close neighbors maintained by the graph  $\beta$ -Skeleton to determine the particles that are with a close neighbor a zone that excludes the existence of a second neighbor. [4]

# Relation between ellipticity and prolateness



# Relation between ellipticity and $\Omega_{DE}$



# Conclusions

- Ellipticity and prolaticity values are not randomly distributed. On the contrary, they were close to a focus determined by the mean value of ellipticity linked to the mean value of Planck's cosmology for Abacus Cosmos data set.
- The statistical method used during this work allows us to determine a relationship between ellipticity of the voids in a simulation and the cosmological parameters  $\Omega_{DE}$  with which the simulation was constructed.

# References I

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