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Titolo: "The Hubble diagram in a nonhomogeneous universe"

Descrizione: In the standard cosmological framework, the Hubble diagram is interpreted by assuming that the light emitted by standard candles propagates in a spatially homogeneous and isotropic spacetime. However, the light from "point sources" —such as supernovae or Gamma Ray Bursts— probes the Universe on scales where the homogeneity principle could be no longer valid. Inhomogeneities are expected to induce a bias and a dispersion of the Hubble diagram. This is investigated by considering a Swiss-cheese cosmological model, which is an exact solution of the Einstein field equations, is strongly inhomogeneous on small scales, but has the same expansion history as a strictly homogeneous and isotropic universe. The student should simulate Hubble diagrams in such models, to quantify the influence of inhomogeneities on the measurement of the cosmological parameters.