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Measuring cosmological parameters with GRBs: status and perspectives

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Given their huge isotropic-equivalent radiated energies, up to more than 10^{54} erg released in a few tens of seconds,
and their redshift distribution extending up to more than z = 9, Gamma-Ray Bursts (GRB) are in principle a powerful tool for
measuring the geometry and expansion rate of the Universe. In the recent years, several attempts have been made to
exploit the correlation between the photon energy at which the νFν spectrum peaks ("peak energy") and the radiated energy (or
luminosity) for "standardizing" GRBs and use them as tools (complementary to other probes like SN Ia, BAO and the CMB) for the estimate of cosmological
parameters. These studies show that already with the present data set GRBs can provide a significant and independent
confirmation of $\Omega_M \sim 0.3$ for a flat ΛCDM universe and that the measurements expected from present and next GRB
experiments (e.g. Swift, Fermi/GBM, SVOM, CALET/GBM, UFFO) will allow us to substantially improve the constraints on Ω_M and Ω_Λ, and, in particular, to get unique clues on dark energy properties and evolution.

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