A multi-colour study of the dark GRB 000210 host galaxy and its environment - DTU Orbit

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We present UBVRIZJsHKs broad band photometry of the host galaxy of the dark gamma-ray burst (GRB) of February 10, 2000. These observations represent the most exhaustive photometry given to date of any GRB host galaxy. A grid of spectral templates have been fitted to the Spectral Energy Distribution (SED) of the host. The derived photometric redshift is \( z = 0.842(-0.042)(+0.014) \), which is in excellent agreement with the spectroscopic redshift \( z = 0.8463 +/- 0.0002 \) proposed by Piro et al. (2002) based on a single emission line. Furthermore, we have determined the photometric redshift of all the galaxies in an area of \( 6' \times 6' \) around the host galaxy, in order to check for their overdensity in the environment of the host. We find that the GRB 000210 host galaxy is a subluminous galaxy \( (L \sim 0.5 +/- 0.2 L^*) \), with no companions above our detection threshold of \( 0.18 +/- 0.06 L^* \). Based on the restframe ultraviolet flux a star formation rate of \( 2.1 +/- 0.2 M_\odot \text{yr}^{-1} \) is estimated. The best fit to the SED is obtained for a starburst template with an age of \( 0.181(-0.026)(+0.037) \) Gyr and a very low extinction \( (A(v) \sim 0) \). We discuss the implications of the inferred low value of \( A(v) \) and the age of the dominant stellar population for the non-detection of the GRB 000210 optical afterglow.

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