

# Formation of Gamma Ray Bursts in interacting galaxies

## Abstract

Long duration Gamma Ray Bursts (GRBs) are rare and extremely bright transients, originating in massive stars. The interstellar medium conditions in which these energetic events form is not understood. However, it is most likely that their very massive progenitor stars originate in dense and massive star clusters. Such clusters are commonly found in interacting galaxies. The HI 21cm emission line is the most powerful tool to investigate the signatures of interaction. Spatially resolved studies of HI 21cm emission for the two nearby GRB hosts have indeed revealed interactions. MeerKAT is the sole telescope that has sufficient sensitivity for such studies to be conducted for the first time at redshifts beyond the nearby Universe, where a reasonable number of GRB hosts are located. Here we propose to study the structure of atomic gas in three GRB host galaxies beyond the nearby hosts with MeerKAT. Our main objectives are (i) to investigate whether the locations of these energetic events are coincident with the high column-density gas in their hosts, (ii) to search for tidal tails, extended gas, companion galaxies, and evidence for interactions in the host galaxies, and test the hypothesis that these explosions arise in galaxy-galaxy interactions. The proposed observations will allow us not only to achieve our scientific goals for the three target galaxies, but also start building up a sizeable sample which is crucial for understanding the large-scale dynamics that single out GRB host galaxies and lead to the formation of the progenitors of such rare and extreme events.