

The Third National Workshop on the SKA Project - The Italian Route to the SKAO Revolution



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HIGH-RESOLUTION AND HIGH-SENSITIVITY WANTED: THE IMPACT OF SKA ON GRBs

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Gamma-Ray Bursts (GRBs) are the most powerful explosions in the Universe. They are thought to be generated by the collapse of a massive star (long GRBs) or a NS-NS or NS-BH merger (short GRBs). Regardless of the progenitor's nature, a spinning, stellar mass BH or a highly magnetized NS is eventually produced, and this central engine launches a jet of ionized matter which interacts with the circum-burst medium, producing the so-called afterglow emission. The radio band and in particular VLBI already proved to be unique tools to investigate the superluminal motion, the expansion and the structure of the jet. However, high-sensitivity, high-resolution facilities are needed to detect radio afterglows and to resolve the host galaxy contribution out. In this talk I will discuss two representative cases: GRB 201015A and GRB 200716C. The former has been studied thanks to the high resolution of e-MERLIN and EVN, which allowed us to distinguish the proper afterglow emission from the host galaxy contribution, but a higher sensitivity could have strongly improved the modeling. On the other hand, the host galaxy of GRB 200716C shows an unusual spectrum which can be explained with an incredibly high star formation rate, a weak AGN or a combination of them. Since the galaxy has not been resolved yet, the high resolution provided by VLBI would solve the conundrum. These two cases are the tip of the iceberg of a population that could easily be studied with the SKA, thanks to its sensitivity, angular resolution, and surveying capabilities.

Research area

Transients

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