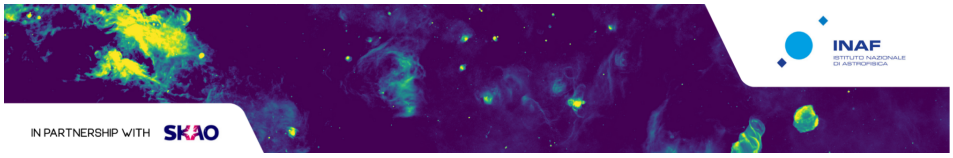

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Unveiling cocoon emission in relativistic type Ic broad-line supernovae

Type Ic broad-line supernovae are energetic events requiring an additional energy source to explain their high kinetic energy, likely driven by a relativistic jet from a rapidly rotating compact remnant. The jet generates a cocoon that influences supernova properties, with signatures predominantly detectable at radio frequencies soon after the explosion. In this talk, we will share findings from our pathfinder program, including a radio supernova with a late-time radio rebrightening inconsistent with circumburst medium shell interaction, showing an unprecedented radio spectral evolution. Despite valuable insights, the program's sensitivity is limited to <200 Mpc events. The SKA order-of-magnitude sensitivity improvement is essential for expanding our understanding, from individual cases to a comprehensive population-wide analysis on the role of the jet in powering these energetic stellar explosions, as well as the processes associated with the formation of the cocoon. We will discuss these discoveries and the promising future of this radio transient research with SKA.

Topics

Transients & GW follow-up

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