VHE Supernovae: state of the art and latest observations with the CTAO-LST1

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Supernovae (SNe) are explosive phenomena known to emit across the entire electromagnetic spectrum, up to soft gamma-rays. Very high energy (VHE) gamma-rays are expected to be produced through shock interactions between dense circumstellar material and the supernova ejecta. However no clear detection has been achieved so far by past or current generation of imaging atmospheric Cherenkov telescopes (IACTs). One of the main suppressing factors is gamma-gamma absorption, caused by low energy photons from the SN photosphere. Current models predict that with the upcoming Cherenkov Telescope Array Observatory (CTAO) we will be able to detect a very bright source up to 10 Mpc.

In this contribution, I will present the current state of the art of SNe observations at VHE, focusing on the latest results obtained with the first CTA- Large Sized Telescope. Despite not achieving any significant detection, gamma-rays upper-limits still offer a valuable insight into the event, providing useful constraints on the mass loss history of the progenitor star and the nature of the supernova explosion.

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