



Contribution ID: 89

Type: **not specified**

Evidence of hadronic origin of the gamma-ray emission from the nova RS Oph by the MAGIC telescopes

Thursday, 8 September 2022 17:12 (18 minutes)

RS Ophiuchi (RS Oph) is a symbiotic recurrent nova that shows eruptive events roughly every 15 years. On August 8th August 2021, RS Oph erupted with its latest outburst. This event was detected with a wide range of multi-wavelength (MWL) instruments from radio up to very-high-energy (VHE) gamma rays. The MAGIC telescopes followed up on optical and high-energy triggers and initiated an observation campaign from August 9th till September 1st. RS Oph is the first nova detected in the VHE gamma-ray energy range. Together with optical, high energy, and VHE emission detected by MAGIC, it is evident that RS Oph conclusively accelerates hadrons during its eruption. We report on the detection of VHE gamma rays at a significant level of 13.2σ during the first 4 days of RS Oph with the MAGIC telescope. More importantly, we will present the MWL modeling which reveals a hadronic origin of the gamma-ray emission in this 2021 eruption, and its further implications for Galactic cosmic-rays.

Summary

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Session Classification: Galactic Sources