

Capturing the evolution of RS Ophiuchi's 2021 nova explosion with the European VLBI network

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Content

Nova outbursts are powerful astronomical events occurring in binary star systems, where a white dwarf accumulates material from its companion star until a critical pressure and temperature are reached and trigger a thermonuclear outburst. In this talk we'll focus on the well known recurrent and symbiotic nova RS Ophiuchi (RS Oph) that experienced a new outburst in August 2021, representing the first nova ever detected at very-high energies ($E > 100$ GeV). In this context, we present the results of a very long baseline interferometry (VLBI) monitoring with the European VLBI Network (EVN) at 1.65 and 5 GHz, performed from 14 to 65 days post-explosion. We characterized in great detail the evolving morphology of the expanding bipolar ejecta and determined the physical conditions of the surrounding medium. We estimated the expansion speed of the two elongated bipolar outflows, the white dwarf accretion rate, the mass loss rate of the companion star, the radial evolution of the surrounding medium density, as well as the properties of the density enhancement on the orbital plane.

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