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Giant radio flares from microqusars

One of the most amazing microquasars is the Cyg X-3 binary system with a black hole and a massive Wolf-Rayet star. In 2024, during multi-frequency monitoring with the RATAN-600 radio telescope, we detected five giant (>10Jy) flares from Cyg X-3. The onsets of flares was clearly associated with the detection of significant Gamma-ray radiation at 0.1-300 GeV (Fermi space observatory). The flares occurred just after the hyper-soft X-ray state, when the flux of hard X-ray radiation (15-50 keV) strongly increased from zero, and a flux of soft radiation of 4-10 keV (MAXI monitor) decreased. The flares trigger by change of supercritical rate of matter accretion onto black hole, variations in the state of the corona and the accretion disk, and changes in the collimation process of jets. Radio flares evolved on different time scales from 10-60 days: at first, the flux grew linearly with time, and the radio emission was optically thick at frequencies below 2 GHz, then after the maximum of the flare, there was an exponential attenuation with a ''softening" of the spectrum (spectral index varied from -0.1 to -0.9). After period of the almost zero radio fluxes GRS 1915+105 wake up in 2023 and then maximum flux reached 5.5 Jy at 2.3 GHz, unexampled for measurements before. We followed this giant flare between August 1-9, 2023 simultaneously on two frequencies 4.7 and 8.2 GHz in the daily multi-azimuthal mode observations, when flux were measured every 8.6 minutes within interval +-2.5 hours from the local culmination time.

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