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An accretion disk with magnetic outflows triggered by a TDE in CLAGN 1ES 1927+654

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The CLAGN 1ES 1927+654 was known as a type 2 Seyfert galaxy, which exhibited drastic variability recently in ultraviolet (UV)/optical and X-ray bands. An UV/optical outburst was observed in the end of 2017, and it reached the peak luminosity ˜50 d later. The high-cadence observations showed a rapid X-ray flux decline with complete disappearance of the power-law hard X-ray component when the soft X-ray thermal emission reached its lowest level about 150 d after the UV/optical peak. The power-law X-ray component reappeared with thermal X-ray emission brightening from its lowest flux within next ˜100 d. We propose a magnetic disk-outflow model to explain the observational features of this source. We assume an episodic accretion event taking place in the outer region of the disk surrounding a central black hole (BH), which is probably due to a red giant star tidally disrupted by the BH. The inner thin disk with corona is completely swept by the TDE disk when the gas reaches the innermost circular stable orbit. The field threading the disrupted star is dragged inwards by the TDE disk, which accelerates outflows from the disk. The disk dimmed since a large fraction of the energy released in the disk is tapped into the outflows. The accretion rate of the TDE disk declines with time, and ultimately, it turns out to be a thin disc, which is inefficient for field advection, and the outflows are switched off. A thin disc with corona reappears later several hundred days after the outburst.

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