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Searching for X-ray eclipses in NGC 6814 using dense optical/UV to X-ray monitoring with Swift

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NGC 6814 is a nearby ($z = 0.005$) Seyfert 1.5 galaxy that we recently showed had undergone a rapid X-ray occultation event during an *XMM-Newton* observation from 2016. The X-ray eclipse of high column ($N_H \approx 10^{23} \text{ cm}^{-2}$), mildly ionised ($\log \xi \approx 1 \text{ erg cm s}^{-1}$) matter lasted ~ 45 ks, with ingress and egress each lasting ~ 14 ks, revealing a partially covered X-ray region we estimated to be ~ 25 gravitational radii across. From August to November 2022 we observed NGC 6814 3-4 times per day with *Swift* to search for new X-ray eclipses to better understand the environment in this AGN. We present here a new analysis of the 2016 *XMM-Newton* data using X-ray colour-colour diagrams that reveal an inhomogeneous, clumpy obscurer, which is likely embedded within an extended, large scale structure based on simultaneous and long-term *Swift* coverage. Our 2022 *Swift* campaign reveals no new X-ray eclipses, but offers a rich data set with which we conduct the first thermal reverberation analysis of this AGN. We find highly correlated optical/UV to X-ray variability that exhibits a significantly flatter time-lag spectrum than the predicted $4/3$ power law relation of a standard X-ray illuminated accretion disc. Furthermore, we find that during the 2016 X-ray eclipse X-rays de-correlate from optical/UV variation before resuming highly correlated broad band variability ~ 30 days later.

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