again consistent with zero but the CCF was slightly asymmetric in the sense of a *b*-band lag of less than half a *Swift* orbit (i.e. <48 min).

(v) By splitting individual *Swift* ToO observations into 200 s bins, we find a weak correlation between the *uvw2* and the X-ray lightcurves with a lag of ∼400 s.

(vi) The *UVOT* colours are consistent with the expectation from a standard optically thick accretion disc model, but only with the addition of a small amount of reddening.

These *Swift* observations, together with previous less extensive observations involving *Chandra* (Desroches et al. 2006), all indicate that the UV/optical emission in NGC 4395 probably lags behind the X-ray emission by a very short time-scale, certainly less than 48 min and more likely closer to a few hundred seconds. There are no observations which suggest that the UV/optical emission as observed on short (i.e. hours-day) time-scales leads the X-ray emission. An UV/optical lag of a few hundred seconds is consistent with the light-travel time to the UV/optical emission region in the accretion disc and thus strongly suggests that the short-time-scale UV/optical variations arise from reprocessing of X-ray emission.

If the UV/optical variability is driven mainly by reprocessing of X-ray emission, it is necessary that the variable component of the luminosity in the X-ray band exceeds that in the UV/optical bands. It is hard to measure the relative luminosities precisely as our observations do not cover all possible wavebands, but we can make an approximate calculation. For example, in Fig. 1 we see that the UV/optical variability is greatest in the *uvw2* band where the range of fluxes is $\sim 4 \times 10^{-15}$ ergs cm^{-2} s^{-1} Å^{-1}. In order to obtain the total variable UV/optical flux which might be driven by the X-rays we need to integrate over all UV/optical bands. If we take a total bandwidth of 1000 Å, and a flat spectrum, we would obtain a variable flux of $\sim 4 \times 10^{-12}$ ergs cm^{-2} s^{-1}. For the Swift XRT a 2–10 keV flux of 1×10^{-11} ergs cm^{-2} s^{-1}, assuming a typical NGC 4395 photon index of 1.6, corresponds to ∼0.1 counts s^{-1}. Thus the variable 2–10 keV flux is $\sim 4 \times 10^{-11}$ ergs cm^{-2} s^{-1}. Even allowing for the fact that probably less than half of the observed X-ray luminosity impinges upon the disc, this crude estimate indicates that there is probably sufficient luminosity in the X-ray variations to drive the UV/optical variability.

One might argue that simply extending the *uvw2* variability over 1000 Å underestimates the total variable UV/optical luminosity. On the other hand, the 2–10 keV flux is less, by factors of a few, than the total irradiating X-ray flux, which may compensate. Other methods of estimating the total variable luminosity in the relevant bands, e.g. by modelling of the accretion disc, reach broadly the same conclusion. We therefore conclude that although there is probably not a great deal of room to spare, the luminosity in the X-ray band is just about sufficient to drive the UV/optical variability.

We also note that our treatment is rather simplistic. In reality the enhanced UV/optical emission which is produced by X-ray irradiation will probably lead to an enhanced flux of seed photons into the X-ray emitting corona, and hence to further X-ray emission. Thus variations in both bands may be prolonged in this feedback process. However, as long as the feedback is not too strong, the X-ray/UV-optical lag will remain as a valid indicator of the approximate separation of the emission regions.

The reason for the large outburst in 2008 is not entirely clear. Janiuk & Czerny (2011) suggest that disc radiation pressure instabilities, which might produce outbursts not too different from that seen, might occur in AGN such as NGC 4395 with a few-year time-scale. Janiuk & Czerny (2011) suggest that an accretion rate greater than 0.025 Eddington, which is probably just above that of NGC 4395, is required for the instability to be relevant in AGN. However, given the uncertainties both in theoretical modelling and in estimating masses and accretion rates, this instability might still be relevant in NGC 4395. Alternatively the apparent outburst may just be part of the normal stochastic variability of the AGN. Although the X-ray flux in the 2011 monitoring observations did not reach the same level as in 2008, the mean 2011 flux level is a good deal higher than in the second part of the 2008–2009 monitoring observations and there are other similarities, e.g. softening of the spectrum with increasing flux (Dwelly et al., in preparation). We discuss the detailed temporal variability in more detail elsewhere (M^{c}Hardy et al, in preparation) .

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