THE NATURE OF THE NIR EMISSION FROM SEYFERT 1 GALAXIES: NGC 4051

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The near infrared emission (NIR) of radio quiet active galactic nuclei is commonly attributed to dust, absorbing and re-emitting some of the nuclear UV radiation. The dust can survive only at distances larger than a few light months, and any rapid variation of the nuclear radiation, on timescales of a day or less, will be completely smeared out.

In order to test this paradigm, we have undertaken a high time resolution monitoring program of nearby Seyfert 1 galaxies in the K band (2.2 μ). The target galaxies are all known from the EXOSAT long looks to be highly variable in the X rays on timescales from minutes to days: if a fraction of the NIR emission is direct nuclear radiation, NIR variations on similar timescales are expected. The observing technique, described in detail in Hunt et al. (1992, A&A 257, 434), allows a relative photometric accuracy of 1 to 2% according to the quality of the night, and a sampling time of 10 to 20 minutes. In about 14 hours of total exposure, no *rapid* variation larger than 4% has been detected.

We have instead detected a *slow* outburst in NGC 4051, which flared and dimmed by more than a factor of 2 in 6 months: such a timescale is compatible with realistic dust distributions. However the UV flux, although sparsely sampled, is less variable than the near infrared. The available data suggest that dust reprocessing of variable UV radiation from the nucleus is an acceptable explanation only if the light travel time to the dust is shorter than the UV variability timescale, and the NIR to UV ratio remains nearly constant. Alternatively, the NIR could be direct non–thermal emission from the nucleus. In either case NGC 4051 does not fit into the same scheme as Fairall 9, NGC 3783, and NGC 1566, where the UV variations are the dominant ones, and are reprocessed into NIR variations after a non–negligible delay. A supernova in a heavily obscured starburst is excluded.

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