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- [outreach page for the project](#) , by Tao Chen

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The accretion of matter by black holes leads to the emission of copious amounts of X-rays through different emission processes. This emission is, however, not steady in time, and shows a very high degree of variability. A particular aspect of this variability is that, in the large majority of times, it is not stochastic, but seems organised. This, therefore, means that it has a tight connection with the matter falling on the black hole. Thus it appears as a new diagnostic to study the immediate surrounding of those objects. Past studies have already shown that some of this variability was linked to typical time scales of the accretion disc. But the picture is not so simple, since the variability is seen to be the weakest when the disc dominates the broad band emission from the black hole.

The goal of this project is to try to understand the origin of this variability through the systematic study of the power density spectra (ie the Fourier transform of X-ray light curves), and their connection with the different X-ray emitting media (through X-ray spectroscopy), and the jet (emitting in radio). For sources bright enough we will establish the energy spectra of these variabilities and compare them with existing models of emission. This way we will provide new constraints on the origin of the variability and thus make a step forward in the understanding of how black holes accrete (and eject) matter. This study will make use of the large observational databases of the *RXTE* and the *INTEGRAL* satellites.

An overview talk on the current state of the project as presented at the Collaboration Meeting in September 2010 in Istanbul can be found [here](#) .

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