

Extended Spectral Coverage via Variable Time Lags in One Time Correlation Analysis

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Long series of images with a fixed time lag is used for the traditional one-time correlation analysis. However, it is not always possible to collect images with a fixed time lag due to technical difficulties, such as, initial buffering, jittering, and possible pauses during data acquisition as a result of concomitant computer/network operations. Under such conditions, images are acquired with a variable time lag. The system behavior at long time lags can be studied by combining data sets acquired with variable time lags. We have developed new software tools for the one-time correlation analysis that allow binning of the time according to variable time lags. These new tools can be used to effectively span fast and slow dynamics of materials to encounter two opposite constraints. The fast dynamics allow capturing of any fast occurring decorrelations. The slow dynamics provides information regarding the system behavior far in time. These new software tools are now available in scikit-beam (<https://github.com/scikit-beam/scikit-beam>). The scikit-beam is a python package currently being developed for the beamlines of NSLS-II. This package will also be available for the broader scientific community. The functionality of our new software tools will be discussed.