

# Notes for Shappee et al. "THE MAN BEHIND THE CURTAIN: X-RAYS DRIVE THE UV THROUGH NIR VARIABILITY IN THE 2013 ACTIVE GALACTIC NUCLEUS OUTBURST IN NGC 2617"

MALTE BRINCH

University of Copenhagen

November 2019

## 1. INTRODUCTION

Broad-line and continuum parts of the AGN are time variable, which is what allows reverberation mapping. Changing look AGN exist which change their Seyfert type from 2 to 1. It is possible but rare for changes to be so large that the broad-line components of  $H\alpha$  and  $H\beta$  appear in a Seyfert 2 or vanish from a Seyfert 1. Large changes in X-ray emission might be from the central BH accreting starts from the surrounding galaxy core. The X-rays are generally believed to arise from Compton up-scattering of disk photons in a hot corona. JAVALIN is used for lag analysis. Flux is fitted instead of magnitude to make it independent for host galaxy contamination since the mean flux is subtracted from the light curves as part of the analysis. Variability seems to be lead by the X-rays and then redder and redder bands. The natural explanation of the observations seems to be variability driven by X-ray irradiation of the BH accretion disk. The model does not include any dust reprocessing. If there is significant reprocessing of UV and optical photons on scales larger than the BLR, then the NIR would respond to the increase in X-ray flux on two distinct timescales, whereas only one is currently included in their models. Determining the physical origins of the DRW parameters and their scalings is difficult. Kelly et al. (2009) argue that the DRW timescale could be related to the thermal timescale of the disk, while MacLeod et al. (2010) note that the scalings of both the DRW timescale and amplitude with wavelength, BH mass, and luminosity all seem too weak compared to the natural scalings one would expect for a simple disk model.

Maybe we can use the sigma and tau values for priors?